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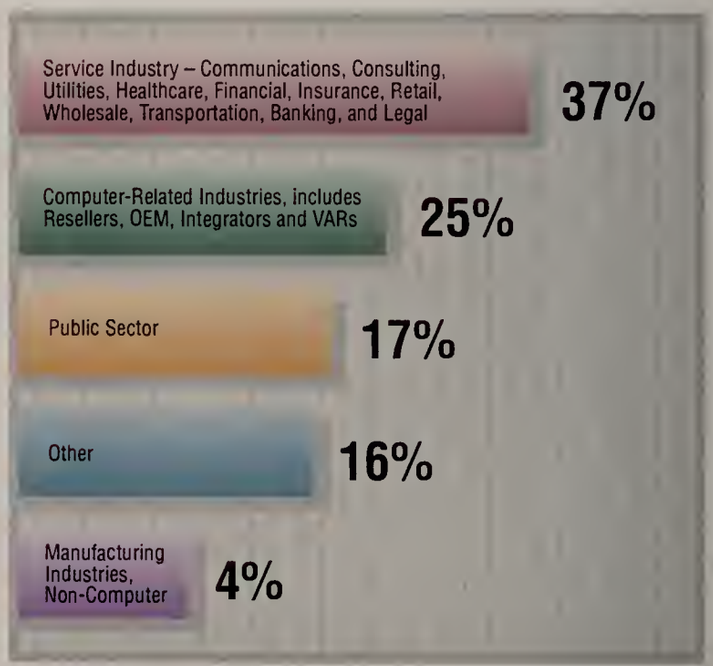

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SEPTEMBER 4, 1995 VOLUME 12, NUMBER 36

NetworkWorld

THE NEWSWEEKLY OF ENTERPRISE NETWORK COMPUTING

NetworkWorld TEST ALLIANCE

The first token-ring switch shows off its speed. Page 43.

Lotus readies cc:Mail-Web hooks

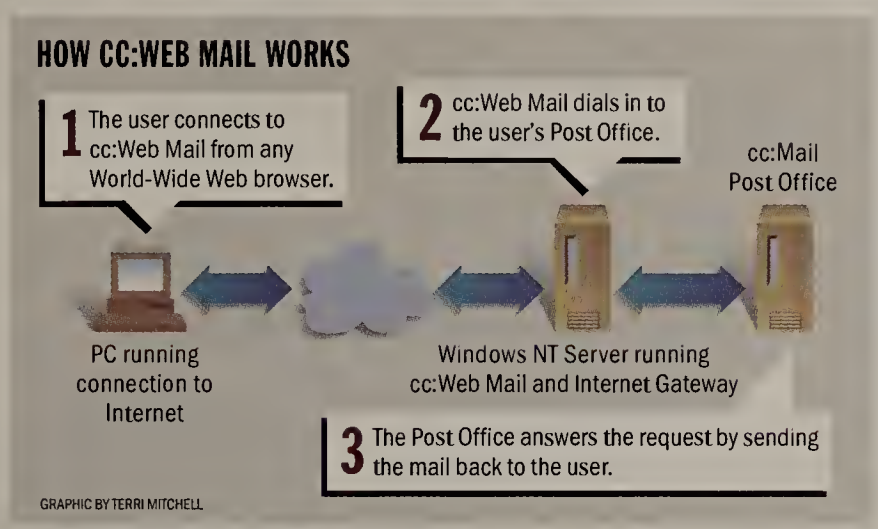
New software would let mobile users access their electronic mail through the 'Net.

By Annmarie Timmins
Cambridge, Mass.

Lotus Development Corp. is polishing up an unusual option for remote mail access that will make message retrieval possible through any Internet-ready PC.

The as yet unannounced cc:Web Mail will run on a PC server and allow users to log on to a cc:Mail Post Office from home or remote sites through any standard World-Wide Web browser.

See **cc:Mail-Web,** *page 55*



IBM comes clean on ATM – finally

By Michael Cooney
Raleigh, N.C.

IBM is trying to bring its ATM big picture into focus.

After months of dribbling out information and waffling on details, the company last week finally spelled out the specifics of its Switched Virtual Network (SVN) architecture (*NW,* Aug. 14, page 6).

SVN is likely the single most important IBM Asynchronous Transfer Mode announcement made to date because it describes, albeit in sometimes vague terms, how the company plans to migrate existing applications and devices to the ATM world.

IBM is betting the network farm on ATM but is one of the last big players to spell out its long-range plans, trailing pioneers such as Cisco Systems, Inc. and Newbridge Networks, Inc.

Initial reaction to the plan has been mixed, with some saying IBM has set the new gold standard for ATM networks and others saying the company's plan is too short on details.

SVN has three main components: periphery switching, back-

See **IBM,** *page 55*

Get a grip

ATM services put you in control, if you can deal with the alphabet soup. Page 39.

- **Xylan and OnStream – formerly T3plus – air what they hope will be ATM smashes. Page 8.**
- **CrossComm, Agile and others launch ATM edge devices, LAN-emulation products. Page 23.**

Network Notes users want more

By Annmarie Timmins and John Cox

AT&T has delivered the cost savings and easy administration it promised with Network Notes, but early customers say the public network-based groupware service needs improvement in plenty of other areas.

The users' wish list includes gaining the ability to run their own applications on AT&T's server farm, rather than simply housing data there. They also want security assurances and a fax gateway.

AT&T made Network Notes commercially available nationwide last month and introduced nine early users, several of which are using the service to provide news feeds and other on-line offerings to remote customer sites.

Overall, AT&T's customers are pleased with Network Notes, saying it allows them to set up intercompany and intracompany collaborative computing links that would have been either too complicated or expensive to set up on their own.

Individual, Inc. in Burlington, Mass., has begun offering a daily news service, called First, to clients' desktops through Network Notes. Currently, the news feeds can be customized on a company-by-company basis, but Individual would like to offer feeds customized to people within those companies, as well.

To enable this, Individual would need to run its own applications at AT&T's Network Notes server farm, said Paul Pinella, First's product manager. But AT&T is not set up to administer or bill for that kind of service, he added.

SandPoint Company, L.L.C. in Cambridge, Mass., noticed similar constraints.

The company is using Network Notes to provide a news ser-

See **Network Notes,** *page 55*

Novell goes back to its network roots

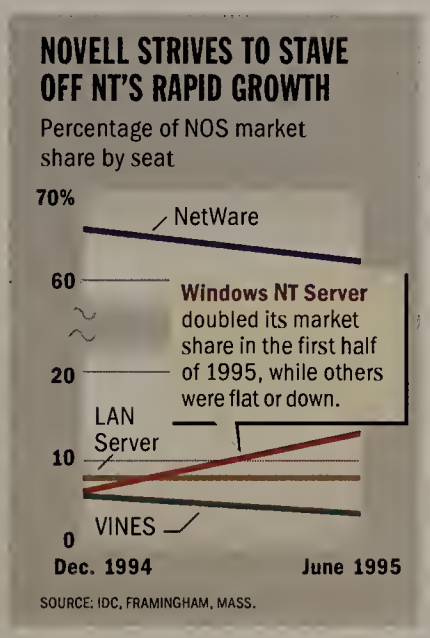
By Kevin Fogarty
Provo, Utah

Novell, Inc. later this month will take the wraps off a broad plan designed to help users evolve their NetWare networks to take advantage of best-of-breed products from multiple vendors.

The new plan, which sources said will be aired in time for NetWorld+Interop, will involve integrating Windows NT and other operating systems so tightly with NetWare that users will have no reason to go to Microsoft Corp. or any other company for their core network operating system (NOS).

At the same time, the company will de-emphasize its plans for SuperNOS, a combination of

See **Novell,** *page 56*



NW roundtable

Clearing hurdles on road to electronic commerce

By Ellen Messmer
Boston

Electronic commerce is taking off, but the network managers responsible for bringing it to corporate America are coming face-to-face with problems, including a dearth of standards, security and bandwidth in the local loop.

Bill Niemi (l.) and Kaiser Majid *grapple with similar electronic commerce issues.*

Users at the recent *Network World*-sponsored roundtable on electronic commerce said they are employing a mix of old and new technologies — everything from electronic data interchange and Web sites to interactive voice response and on-line trading systems — to foster ties with customers, suppliers and business partners.

But those types of communications are unduly expensive in most vertical industries because they lack comprehensive application and network-

See **Commerce,** *page 37*

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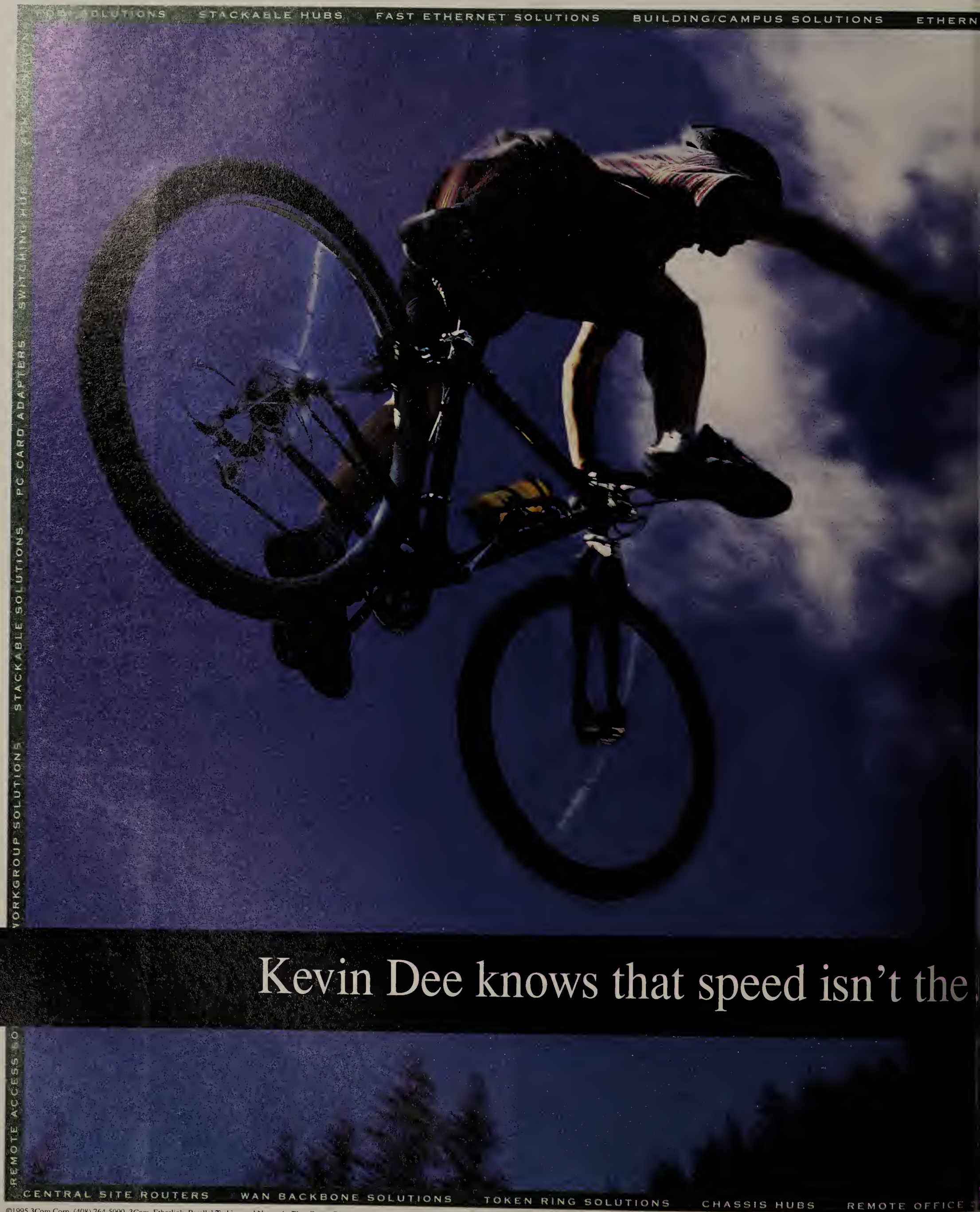

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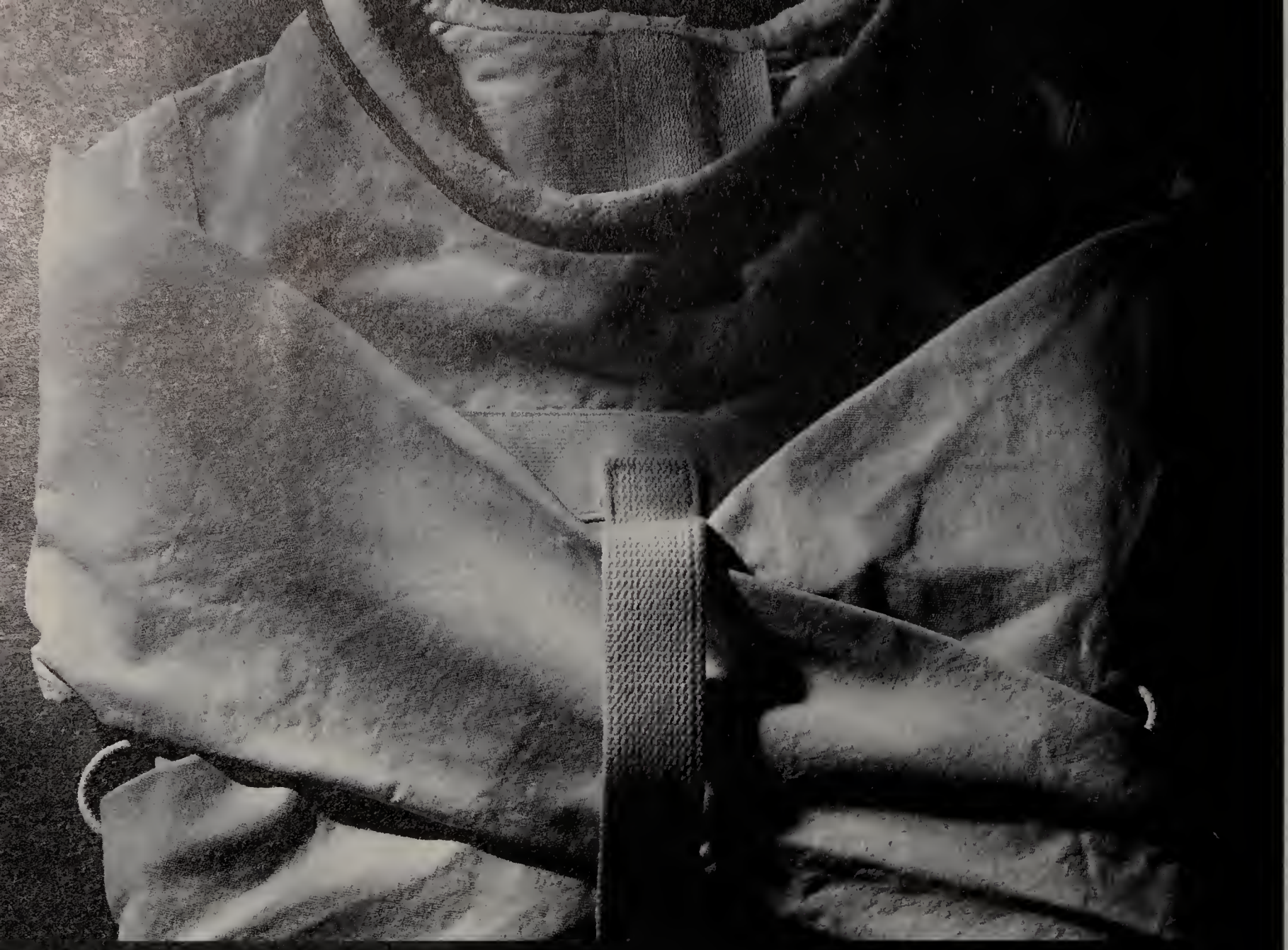

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NetworkWorld
An IDG Publication

Contents

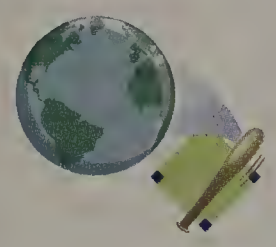
Briefs, September 4, 1995

Web/Notes hookup

■ WorldCom, Inc., which offers an on-line version of Lotus Development Corp. Notes, last week added a World-Wide Web publishing service called NetFusion. For a $2,000 setup fee, users can replicate a Notes database to a WorldCom server and WorldCom will post it on the Web. The monthly fee is $200 for the first 25M bytes and $100 for every 25M bytes thereafter.

Baseball makes Internet pitch

■ Baseball announcers will give live play-by-play reports on the Internet for the first time Sept. 5 and 6, when the Seattle Mariners visit the New York Yankees. The experimental simulcasts will be available to anyone who has a computer with sound capability and access to the Internet's World-Wide Web. And baseball isn't the only sport getting into the Internet act, as the University of Oregon in Eugene said it will become the first to report a live college sports event via the 'Net when the Ducks take on the University of Illinois in football Sept. 9.



Back to Basic

■ Microsoft Corp. next week is expected to officially unveil Visual Basic 4.0, which will bring the widely used PC application development tool set to the company's 32-bit Windows NT and Windows 95 operating systems. The new version supports OLE 2.0 interfaces, including OLE Custom Controls. The Enterprise Edition of Visual Basic 4.0 also has an integrated tool, called SourceSafe, for software version control and source code management. Microsoft has also attempted to create a three-layer programming model to uncouple client-based code from database servers.

Banking on the 'Net

■ MCI Communications Corp. and First Union Corp. last week said they are pairing up to test a service that would let bank customers conduct business over the Internet. The 18-month trial will involve testing a software package built on Netscape Communications Corp.'s Internet browser that will enable users to click on different banking applications and make secure transactions with the bank from their home or office.

Save that message

■ The National Archives last week issued regulations that agencies must follow for warehousing electronic mail important enough to be considered an historical document of record. The new rules state that federal agencies must issue guidelines to agency employees within 30 days on what E-mail constitutes a federal record and how they can transfer this important E-mail to an electronic records-keeping system or print it out on paper for delivery to the National Archives.

A work of LANart

■ LANart Corp. this week will introduce its SegWay Ethernet switch, a 24-port 10M bit/sec LAN switch that can be stacked five units high for a total of 120 ports. Total capacity is 80M bit/sec divided among up to eight separate Ethernet segments. Users can be assigned to any segment regardless of their physical location. Pricing for the switch, which will be available later this month, starts at $80 per port.

Dan Hosage *heads up Vox Technologies, Inc., a start-up that integrates computers and telephones with a stand-alone device.* *Page 17.*

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NetworkWorld's Mission: To provide news and analysis that help network IS professionals deliver the network computing infrastructure and distributed applications required to meet evolving business needs.

Hypercom promises SNA savings

Company says new no-cost router addition will decrease mainframe gateway costs.

By Michael Cooney
Phoenix

Hypercom Corp. has added a feature to its backbone router that promises to reduce Systems Network Architecture networking costs and help ease the migration of legacy applications to frame relay nets.

The company's new Physical Unit (PU) Concentrator Gateway is a no-cost addition to the software package running in its Integrated Enterprise Network (IEN) routers. The system promises to reduce SNA networking costs by decreasing user WAN traffic, mainframe gateway costs and mainframe definition requirements, Hypercom said. A PU can be any hardware device from a PC to a communications controller.

Analysts said the new feature gives Hypercom a leg up in the branch-office connectivity market and puts it in a class with Cisco Systems, Inc., which also supports PU concentration capabilities. While Cisco typically goes after much larger SNA users than does Hypercom, this feature could take Hypercom into some of those environments, analysts said.

"The PU Concentrator directly reduces the volume of PU session and traffic across the WAN. And in very large SNA networks deploying frame relay, users can reduce the committed information rate they subscribe to from carriers," said Paul Wickre, vice president of marketing and business development for Hypercom.

Wickre *said the PU Concentrator directly reduces WAN traffic.*

IEN 5000 is Hypercom's central backbone router, while its smaller brothers, IEN 3000 and IEN 1000, are remote branch-office routers. IEN routers are multifaceted boxes, containing an integrated router, multiplexer, protocol converter, data service unit/channel service unit, voice over frame relay module and dial-up ISDN backup support.

IEN 5000 connects to the mainframe through another gateway or controller such as IBM's 3172 Interconnect Controller, 3174 communications controller, 3745 front-end processor, or compatible boxes. The PU Concentrator focuses more users on lines linked to the controllers — allowing a maximum of 10,000 users to communicate through those boxes with the mainframe.

"It would be possible to have a network of 10,000 PUs going through a single 3172, which thinks it is supporting only a couple hundred PUs," said Anura Guruge, an independent analyst based in New Ipswich, N.H.

A 3172 has a limit of 1,020 PUs and a 3174 has a limit of 254 PUs, so users can make better use of those devices having to buy additional gateways, he said.

In addition, NetView/390 retains command and control of the downstream devices through the gateway — a function not possible with most traditional SNA gateways, Wickre said. Communications Manager/2 platform, for example, does allow full NetView control.

The PU Concentrator feature works by employing SNA's System Services Control Point functions. SSCP handles SNA address resolution, device configuration, diagnostics and recovery. All SNA devices send and receive SSCP-to-PU data when communicating with the mainframe. The PU Concentrator, however, eliminates that traffic from the backbone, Guruge said.

For example, he noted, if 40 SNA PUs on a LAN are concentrated to appear as one session, only one session will be active across a frame relay link. In a large SNA net, that eliminates thousands of SNA sessions, Guruge said.

Plus, users only need to define the single PU to the mainframe, not 40.

"At market rates of $31 to $101 per frame relay [permanent virtual circuit], large branch networks can see quite a savings," Wickre argued.

This type of savings attracted users at Card Establishment Services/First Data Corp., a Hagerstown, Md.-based credit card services bureau. The firm uses the PU Concentrator feature to concentrate thousands of terminal calls it receives from its 800-number service to a single 56K bit/sec link to an IBM mainframe site.

"We reduced the line costs and number of ports required on the front-end processor," said Max Baer, senior project engineer for the company. "We evaluated other router vendors and chose Hypercom not only for this concentration feature, but because [Hypercom] could handle so many older kinds of SNA traffic, like bisynchronous."

©Hypercom: (602) 548-2120.

Net managers find new tools in Windows 95

By Peggy Watt
San Francisco

Users migrating to Microsoft Corp.'s Windows 95 are finding the company's Systems Management Server (SMS) to be the best way to exploit the operating system's net management features.

"We'd like to use SMS from the start, to do a system inventory and then to install Windows 95 out to the desktops," said Jim deMayo, manager of telecommunications and network systems at Sega of America, Inc., in Redwood City, Calif.

The growing popularity of SMS, which runs under Windows NT Server, gives Microsoft another in.

"Windows 95 is going to help us move to Windows NT," deMayo said.

Because SMS runs on Windows NT Server, net managers who install it may bring in other Microsoft products, such as Microsoft SQL Server, which supplies the database used by SMS.

Even without SMS, network managers will find Windows 95's network security and control features solve many problems they have had with Windows 3.X, said Howard Marks, chief scientist at Tiger Team, Inc., a Microsoft Solutions Provider based in South Norwalk, Conn., who led a discussion about Windows 95's networking at the recent Windows Solutions Conference and Exposition here.

But despite the features and the enthusiastic early migration touted by Microsoft, some managers are proceeding cautiously.

"We're concerned about security and licensing issues, so we're looking at the management options as we evaluate Windows 95," said Darren Palmer, senior technical analyst with Landis & Gyr Powers, Inc. of Buffalo Grove, Ill.

If his company brings in Windows 95, it will almost certainly install SMS on an NT network at the same time, Palmer said.

SMS could be key to other net managers' Windows 95 plans.

"We're looking for an easier way to install and upkeep desktops," said Illysa Glickstein, system coordinator at CMP Publications, Inc. in Manhasset, N.Y., who manages about 1,500 desktops and 50 NetWare 3.12 servers. Glickstein may recommend installing SMS 1.1 on Windows NT servers to better manage Windows 95, she said.

SMS enhances Windows 95 desktop management, Tiger Teams' Marks said. Net managers can use it to install or update the operating system across a network, and SMS can use information from the Windows 95 registry files on each desktop for troubleshooting.

A team of new tools

Technologies for managing Win95 on a network:

- Partial DMI compliance
- Registry
- SMS 1.1
- SNMP support
- System Policy Editor

The Windows 95 registry contains desktop configuration information and replaces most of the .INI files used by Windows 3.X, Marks said.

The registry is especially useful to security-conscious network managers because it is in database form and cannot be modified by users running text editors, even though it resides on the desktop. Rather, the network manager can access the registry and control user access to files, directories and desktop functions through the Windows 95 System Policy Editor — which is not routinely installed with Windows 95.

Microsoft is still enhancing Windows 95 security, Marks added. The first Windows 95 Tune-Up Kit, expected to ship before the end of the year, will add limited support for the Desktop Management Interface controls.■

Cellular heavyweights find key tech partner

By Joanie Wexler
Santa Clara, Calif.

The wireless industry refuses to give up its quest to find the right handheld computer and network service to suit the mobile professional.

Last week, cellular bigwigs AirTouch Communications, Ameritech Cellular Services, Sprint Cellular and US WEST Cellular said they have teamed with Air Communications, Inc. here to bundle their analog cellular services with a multifunction communicator launched last week by Air Communications and slated to ship in October. The device is said to bring analog cellular reliability up to par with that of wired nets.

The AirCommunicator integrates a voice answering machine, a fax receptacle, a serial port for hooking to a laptop, a land-line RJ-11 jack and speakerphone into one unit. The jack-of-all-trades system communicates over the ubiquitous analog cellular network.

Faxes in the field

Users, such as salespeople who find themselves in multiple sites in a given day, can receive faxes via the phone: They get a notification that a fax has been received, then they can use the AirCommunicator to dial the nearest wired fax machine, send the fax and print it out, explained Arthur Gutch, vice president of marketing for the firm.

To improve upon analog cellular's iffy connect track record — about 50% success rates today, analysts said — the device uses the company's AirTrue error-correcting technology that promises the same connectivity and reliability as wireline modems (*NW,* March 20, page 8).

AirTrue monitors cellular links and adjusts data transmissions as conditions dictate, rather than dropping connections when conditions degrade, as do competing schemes.

"We extensively tested the product and saw 100% connectivity," said Kate Hendrick, wireless data product manager at Ameritech.

See **Cellular,** *page 55*

COMMENTS?

See "How to reach us" on the Opinions pages.

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Xylan gives OmniSwitch product an ATM spine

OmniCell add-on integrates traditional LANs with ATM.

By Michael Csenger
Calabasas, Calif.

With a view to eventually replacing the entire contents of wiring closets with all-in-one switches, Xylan Corp. this week will introduce the ATM backbone of its LAN product line.

"ATM means basically nothing if it can't support the installed LANs that people use, so we focused on the LAN side first before adding ATM to [OmniSwitch]."

Kevin Walsh, director of product marketing, Xylan

OmniCell is an Asynchronous Transfer Mode switching backplane that will be added alongside the frame-switching backplane already in Xylan's flagship OmniSwitch, which switches traffic between token-ring, Ethernet and Fiber Distributed Data Interface nets.

Scalable from 2G to 13.2G bit/sec, OmniCell will connect traditional LANs with ATM networks and also perform native ATM switching at speeds from 25M to 622M bit/sec OC-12.

Leading the pack

By combining ATM switching with its mixed bag of LAN support — which includes basic routing via processors on every LAN module — Xylan is an early leader in the field of total LAN integration, analysts said.

"An ATM-based, integrated Layer 2/Layer 3 switch is certainly our golden dream, and it's fair to say that OmniSwitch is the first product we've played with that is pulling together that integration," said Randy Abler, a research engineer at the Georgia Institute of Technology.

"There just aren't a lot of products out there now that even support Ethernet switching over an ATM backbone, and that's of prime importance to us," said Carl Warner, a LAN administrator for Intermedia Communications, Inc. (ICI), a Tampa, Fla.-based carrier that uses two OmniSwitches in its corporate backbone. "At this point, I don't care exactly how the underlying architecture works because everything about ATM is a learning experience for us — as long as it works, which it does."

Georgia Tech and ICI use OmniSwitch with its currently available ATM uplink port, connecting two switches over an OC-3 ATM pipe. Both users intend to test OmniCell as a backbone ATM switch, as well.

"Xylan really is in a unique position; a lot of people talk about similar functionality, but none are all that near to delivering it yet," said Tom Bain, a research analyst with META Group, Inc. in Reston, Va. "Only Cabletron's MMAC-Plus comes close in its intent, but Cabletron won't ship an ATM backplane for it until sometime in the first half of 1996."

Xylan will not begin production shipments of fully functional OmniCells until the second quarter of next year, either.

When all is done, OmniSwitch will serve as a fully integrated ATM and LAN switch with routing functionality and extensive virtual LAN management capabilities. OmniCell will provide an ATM backplane on the switch chassis, into which various ATM modules are slotted. Each module then adds an extra switching element — in 1.6G bit/sec increments — to the overall ATM switching fabric so that one switch can be scaled up to 13.2G bit/sec.

Traditional LAN traffic is switched locally via OmniSwitch's frame bus, which interconnects various LAN interface modules.

The frame and cell backplanes will be joined by an ATM segmentation and reassembly module that provides the interface between LAN and ATM networking.

All elements of the switch and interface modules are then joined by a management bus that acts as the switch's central nervous system.

The base price for an OmniSwitch with the OmniCell ATM fabric will be $13,000. ATM25 and OC-3 ATM interfaces will cost $450 and $1,500 per port, respectively.

✆Xylan: (818) 880-3500.

High-speed networking

Unveiling new name, new ATM concentrator for the wide area

By Tim Greene
Santa Clara, Calif.

OnStream Networks, Inc. — formerly T3plus Networking, Inc. — this week will announce an ATM concentrator that can take in various types of LAN traffic and convert it into cells for transmission across the wide area.

The CS600 is the first member in a new line of Asynchronous Transfer Mode access products called CellStream, which will integrate data, voice and video traffic at speeds from 1.5M to 155M bit/sec.

The CS600 chassis has three slots that can be configured for local connections, such as 10Base-T Ethernet and T-1 voice and data interfaces.

On the wide-area side, the concentrator has a single T-3 port that is compliant with the ATM Forum's standard User-to-Network Interface. It can interface either with a carrier network or other CS600s. Later releases of the product will include Synchronous Optical Network (SONET) OC-3, frame relay and ATM Data Exchange Interface interfaces.

Tom Nolle, president of CIMI Corp., a technology assessment firm in Voorhees, N.J., said the product fits a need for users that do not have ATM LANs but might want to use ATM across the wide area. "It was designed with the reality of ATM demand in mind," he added.

According to Nolle, ATM switches are too expensive and sophisticated for this function and ATM data service units/channel service units (DSU/CSU) do not offer enough features. He thought carriers would buy four or five times as many of the devices as end users, then lease them to end users as part of an ATM service, he said.

The CS600 can be fitted with a maximum of three 10Base-T Ethernet modules, each with two ports that allow 10M bit/sec throughput. The modules can interface with Ethernet hubs, switches or routers, and can bridge ATM LAN traffic to the wide area in compliance with the RFC 1483 specification or translate classic IP traffic to ATM in compliance with RFC 1577.

The DS1 local interfaces can carry channelized T-1 voice and data traffic from DSUs/CSUs, multiplexers and private branch exchanges, meaning traffic on channels as narrow as 64K bit/sec can be established to multiple sites.

The CS600 can also handle unchannelized T-1 traffic.

The CS600 will be available in the first quarter of next year. The base price for the chassis will be $15,450.

A four port DS1 module will cost an additional $8,000, and an eight-port DS1 module will cost

See **ATM,** *page 56*

IBM ushers Digital VAX users into PC server arena

By Michael Cooney

IBM last week introduced an integrated server platform capable of simultaneously running DEC VAX/VMS, OS/2, AIX and Windows applications.

The 7596 Cross Platform Server is aimed largely at Digital Equipment Corp. VAX users that are looking to migrate their legacy applications to the more open world of the PC server arena.

Using the 7596, Digital users can continue running existing VMS and OpenVMS applications while developing new applications for IBM AIX, OS/2 or Microsoft Corp. Windows environments.

Given that Digital earlier this year announced it would be more closely integrating its OpenVMS systems with Microsoft's Windows NT operating system, users may want to focus application development in that environment over OS/2 or AIX, analysts said (*NW,* May 8, page 18).

The modular 7596 is an eight-slot PC server that comes with an optional 66-MHz Intel Corp. 80486 or 90-MHz Pentium processor, a 3.5-inch drive, a 1.08G-byte hard drive, three-channel Redundant Array of Inexpensive Disks (RAID)-based storage access, a twin-channel Small Computer System Interface adapter and a double-speed 600M-byte CD-ROM drive. An Ethernet LAN adapter is also included. This base configuration is priced at $39,150.

On top of the basic server, users can add a VAX Server Module for an additional $58,370 and a RISC System/6000 Module for $18,030, bringing the total system price to $115,550.

7596 server options

Part	Price
Pentium 90-MHz upgrade	$6,205
IBM 16M/4M bit/sec Token-Ring adapter	$295
FDDI EISA adapter	$1,700
EISA Ethernet adapter	$395
64M-byte memory module for VAX Server Module	$11,375
3270 Connection adapter	$618

Perhaps the most important standard feature of the 7596 is a standard software program called the Distributed Resource Broker. The product translates calls from the different modules so all the applications can communicate.

For example, if a user attached to the RS/6000 module wants to include data from a VMS application, the program translates the VMS data into a form AIX understands and then sends it along.

Analysts were not impressed with the new IBM server.

"Most VAX/VMS systems are already on Ethernet LANs. Why do users need to add another box to coexist in the PC server environment when many can already, and the price is way too hefty," said John Logan, director of communications for Aberdeen Group, Inc., a consultancy in Boston. "It's also not at all clear where the VMS license will come from or how much power is in the VAX Application Server."

"This is a tactical box from IBM that it wants to use to grab up VAX users and keep them from going to Hewlett-Packard," said Thomas Nolle, president of CIMI Corp., a consultancy in Voorhees, N.J.

"IBM has never been real good at such products, and this doesn't sound like it'll do much better," he added.

The 7596 is scheduled to be available Oct. 27. Token-Ring and other adapters are priced separately.

✆IBM: (800) 426-3333, Ext. FG901.

CORRECTIONS

The price of Meridian Data, Inc.'s CD Net 5.0 for VINES, which makes data on CD-ROMs accessible to workstations on Banyan Systems, Inc. networks, is $1,995 for an unlimited-user license, not $1,195, as reported Aug. 28 (page 27).

✆Meridan: (408) 438-3100.

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It's called the Answer Wizard. Type in a question in plain English. "How do I get the page to print sideways?" By accessing more than 12,000 help topics, the Answer Wizard will actually show the user how to do it. Questions that once frustrated users can now be answered immediately. Features and capabilities that can make them more productive are instantly revealed. No searching for manuals. No searching for you. In a recent study, the Answer Wizard helped reduce Office application help-desk calls by 44%.** Users spend more time working. You spend more time focusing on the big-picture part of your job, less time responding to repetitive, time-consuming questions.

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AT&T and MCI butt heads on varying ISDN strategies

By Joanie Wexler
Atlanta

Now that ISDN is finally gaining respect, AT&T and its nemesis, MCI Communications Corp., are scrambling to distinguish their respective services.

For its part, AT&T is working with inverse multiplexing vendors to bundle their gear into a managed ISDN offering akin to those it already offers for its frame relay and private-line services, *Network World* has learned.

The equipment, from vendors such as Ascend Communications, Inc. and Teleos Communications, Inc., supports an international ISDN standard that allows a Primary Rate Interface signaling channel to support multiple PRIs. AT&T is aiming the service at users who want to dial up ISDN bandwidth in 384K and 1.544M bit/sec chunks, said Dick Sleazak, managing director of AT&T's global switched digital services.

MCI, meanwhile, is focusing its attention on lower speeds, announcing last week that it has fine-tuned its ISDN offerings to include multirate capabilities as well as new access and inbound options.

Multirate ISDN lets users accommodate high-bandwidth applications by dialing up multiple 64K bit/sec DS0 channels during a single phone call and amalgamating the resultant bandwidth. AT&T's services have long allowed users to create 384K and 1.544M bit/sec pipes in this fashion; MCI has now made the 384K and 1.544M bit/sec multirate speeds available, plus all other DS0 increments from 64K bit/sec and up.

A drawback to MCI's multirate service is that both ends of a link must use MCI as the long-distance carrier, an obstacle to intercompany communications.

Multirate ISDN contrasts with similar services offered by long-haul carriers, whereby customers use inverse multiplexers to dial up channels. Inverse multiplexers make a phone call for each channel dialed, which results in slower connect times.

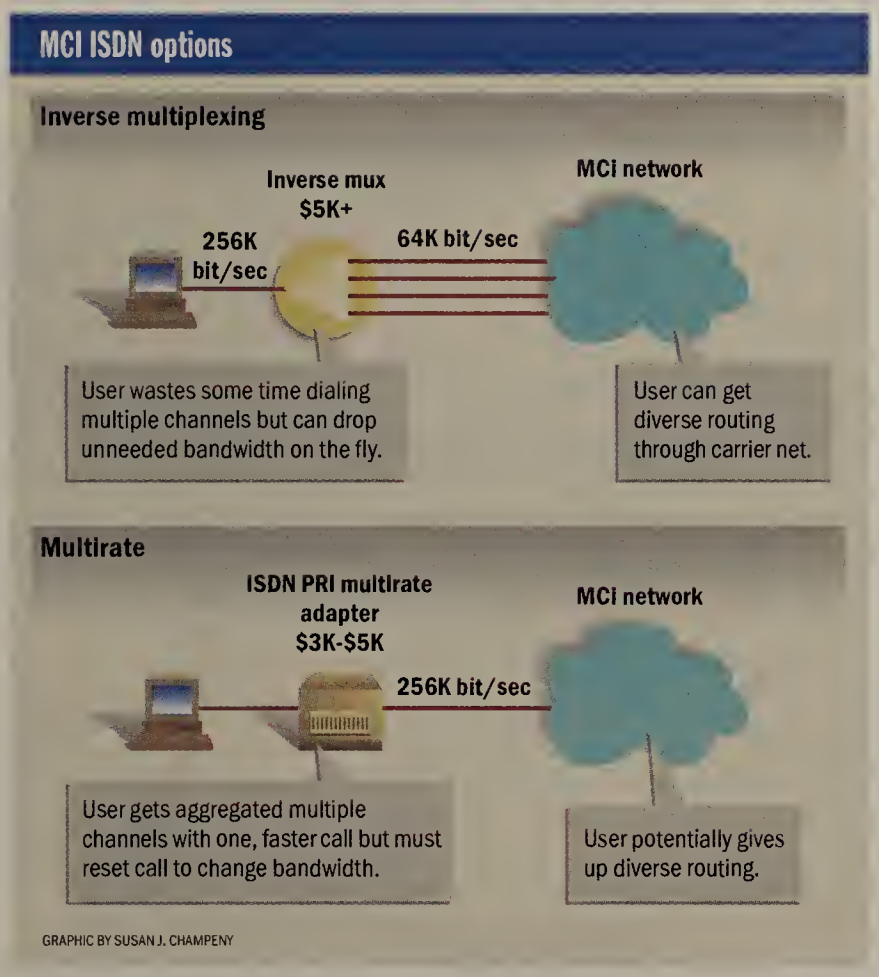
"MCI is the only carrier offering [true] multirate, and I use the service because I can dial up 23 contiguous DS0s in less than 1 second," said David Gustafson, vice president of marketing and sales at Entertainment Digital Network, Inc. in San Francisco.

Inverse multiplexing, however, allows the network to drop off bandwidth that isn't needed, unlike the multirate alternative, which requires a new call to change bandwidth size, said Daniel Briere, president of TeleChoice, Inc., a consulting firm in Verona, N.J.

On the other hand, multirate is less expensive: The per-DS0 cost drops as the number of DS0s dialed increases. Scott Davidson, MCI product manager, said he expects the multirate capability to save some users 40% on transport costs.

MCI also has added support for local switched access service options, including switched PRI multirate offerings from the local exchange carriers. Until now, MCI PRI users needed a dedicated PRI access line directly into the MCI network.

These services are available only in NYNEX Corp. and Southwestern Bell Corp. territories, although MCI said it expects to offer them in all regional Bell company territories by next year. Several observers said this would provide less expensive access than dedicated MCI links. ■



NorTel offers dial-up access

By Tim Greene
Richardson, Texas

Northern Telecom, Inc. will announce at NetWorld+Interop this month a switch designed to support dial-up access to corporate and carrier networks alike.

The company, formerly Northern Telecom, Inc., will also announce enhancements to its Passport multiservice enterprise switch that will enable it to support Advanced Peer-to-Peer Networking nodes and inter-LAN switching.

The remote dial access switch, which so far has not been named, can be linked to X.25, frame relay, ISDN, T-1 and even Ethernets; interfacing with Asynchronous Transfer Mode networks is slated for later.

The switch will come in four models, featuring tens of dial ports for less demanding applications to thousands of ports for telephone carriers and large Internet providers, according to Albert Delorenzi, vice president of Magellan marketing for NorTel. He would not detail the models pending their announcement at NetWorld+Interop.

The product will also support Shiva Corp.'s LANRover remote access server. The NorTel switch is compatible with Shiva's widely used client software for remote access, which is licensed for use in many operating systems, including Microsoft Corp.'s Windows 95.

Besides appealing to corporate users, the switch will be attractive to carriers that can use it to offer dial-up networking services, according to Rosemary Cochran, a principal at Vertical Systems Group, a market research firm in Dedham, Mass.

The switch could be integrated into backbones consisting of NorTel Magellan devices, which include a variety of ATM products ranging from access switches to central-office switches. The remote access switch will also interoperate with any other ATM or frame relay switching backbone.

The product will be available during the first quarter of next year. Beta testing is scheduled to start this month with regional Bell operating companies and interexchange carriers, Delorenzi said.

Also at NetWorld+Interop, NorTel will announce enhancements to its Passport switch to support Ethernet, token-ring, Fiber Distributed Data Interface and ATM switching between LANs. The switch, performing the functions of multiple routers, offers users the ability to integrate LAN environments and build firewalls to safeguard these LANs from dial-up connections.

The Passport is positioned as an enterprise switch or carrier access switch. It has a total capacity of 1.6G bit/sec and can handle frame relay and ATM traffic. Last week, the company announced it has shipped its 1,000th Passport switch since last September.

✆NorTel: (214) 684-1000.

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Target customers include:

- **Large enterprises** looking to provide remote users with dial-up access
- **Internet access providers** needing a core access switch
- **Carriers** seeking to offer enterprise or Internet access services

Pack monitors response times

Low-priced offering includes management console, agents.

By Michael Cooney
Moorpark, Calif.

Start-up Anacapa Software this month will introduce an inexpensive software package that simplifies the monitoring of PC response times across enterprise networks.

The company announced NetScore 24, a $100 software agent that can reside on any Windows or OS/2 machine, and monitor response time between the PC and any user-defined host. The agent works in conjunction with Enterprise Surveillance Center, a $1,000 management console package that registers and displays network performance problems and alerts network administrators when response times are flagging. It, too, runs on OS/2 and Windows.

Alarms are registered on the console and stored in its database. The program can then forward alarms onto a centralized Simple Network Management Protocol-based management platform, such as Hewlett-Packard Co.'s OpenView.

"When most networks were employing [Systems Network Architecture] only, systems such as NetView could keep track of 3270 response-time levels," said Warren Sullivan, director of marketing and business development for Anacapa. "But things are far more complicated than that now, and there is no easy way to measure response-time levels across a multiprotocol, multivendor environment."

NetScore 24 works by pinging, or sending, a transaction to a local or remote server and measuring the time it takes for the server to respond.

Markus Bruetsch, IS operations manager with Price Pfister, Inc., a plumbing fixture maker in Pacoima, Calif., and Anacapa beta site, said the ability to test the response times to multiple servers and track the communications path are the software's most intriguing features.

Company: Anacapa Software
Based: Moorpark, Calif.
Founded: June
Employees: 2
Primary products: Management tools focusing on network performance
First products to market: NetScore 24 and Enterprise Surveillance Center, due in September

"Many management tools are limited to a few types of servers or communications protocols, but Anacapa's software isn't, which makes it more useful in a multiprotocol environment like ours," he said. "With this software, we should be able to respond to problems quicker."

Bruetsch would also like to see a tool that measures response times between the components of distributed client/server applications. "[They] create a whole new set of problems because different parts of the application can affect response times," he said.

NetScore 24 and the Enterprise Surveillance Center software will be available by October.

✆Anacapa: (805) 523-1745.

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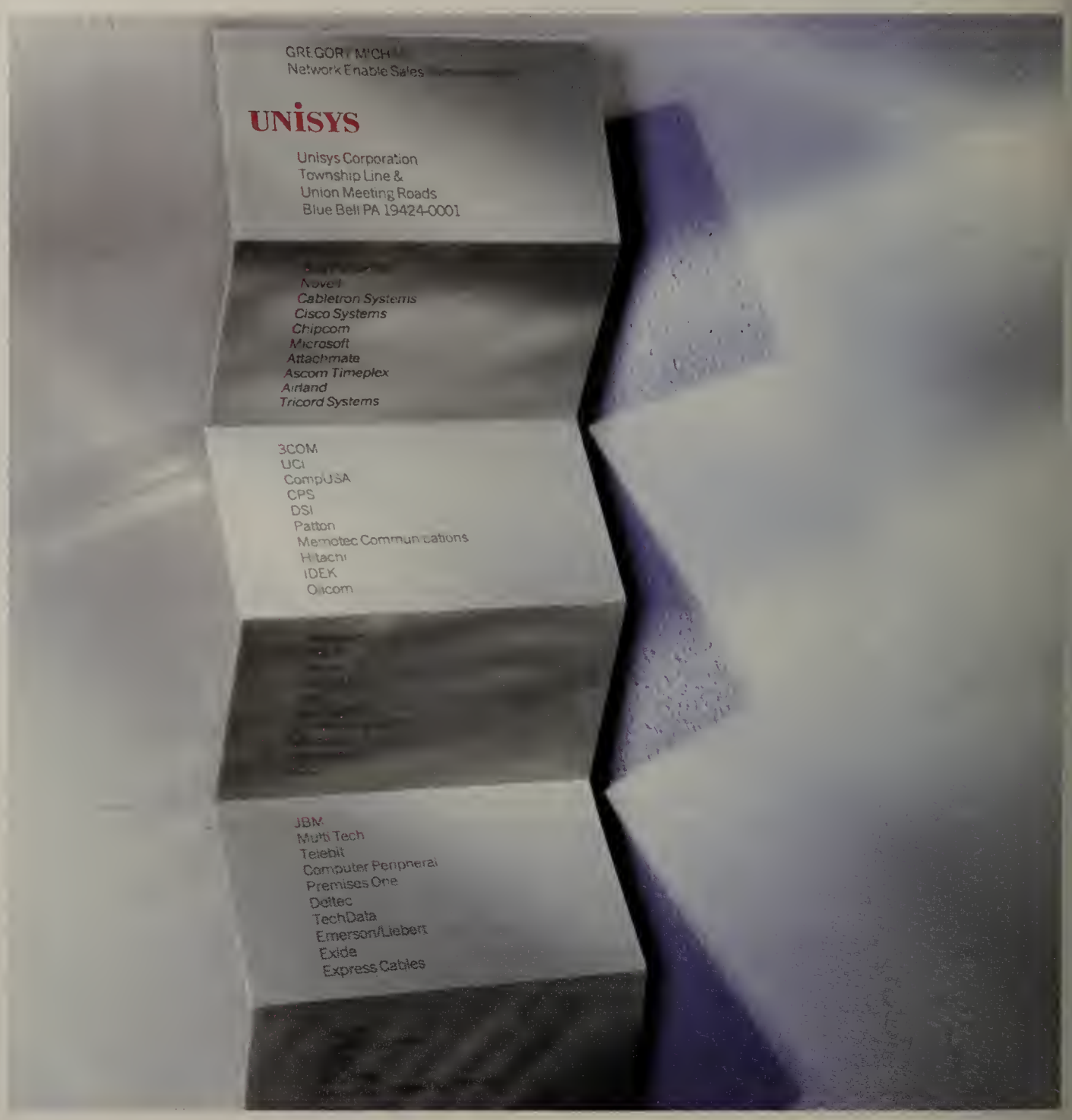

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Briefs

■ *Last week,* **Hypercom, Inc.** *added a* **packetized voice over frame relay** *module to its Integrated Enterprise Network (IEN) family of routers. The module lets users combine branch office LAN, Systems Network Architecture and voice traffic over public and private frame relay circuits.*

Compressed voice can also be sent along a backup ISDN link attached to the IEN. The new module is available for $1,400.

Hypercom: (602) 548-2120.

■ **ADP Autonet,** *a business unit of Automatic Data Processing, Inc., unveiled a partnership with DCS Software and Services, Inc., which produces protocol conversion software for IBM Application System/400 environments. Meanwhile, ADP provides* **X.25 packet-switched service** *on a commercial public network.*

Together, the two plan to offer data communications network hardware and software for extending the reach of mid-range hosts to remote offices.

ADP: (800) 829-2206.

■ **RAM Mobile Data** *has announced a* **pricing package** *that combines Motorola, Inc.'s AirMobile middleware for Lotus Development Corp.'s cc:Mail, RAM wireless data service and Motorola, IBM or Ericsson wireless modems.*

Bundle customers activating their RAM subscriptions by Dec. 31 will receive certificates worth as much as $225 per user that can be redeemed as credit toward RAM wireless service.

■ **Amdahl Corp.** *this week will announce its first line of CMOS-based parallel processing mainframes, known as Millennium, which will be available next year.*

The company will also roll out next year its big direct-access storage device, called Spectris, a .75-terabyte, Redundant Array of Inexpensive Disks (RAID) Level 3 storage facility.

Amdahl: (408) 746-6000.

TeleVox lets your fingers do the walking

Start-up integrates telephone, computer with a stand-alone box to enable easy phone number storage and dial-up.

By Tim Greene
Westminster, Colo.

You've got a PC, a Rolodex and stacks of business cards. You've got a little black book and scraps of paper all over your desk and pinned to the bulletin board.

And you still can't find the phone number you want.

Vox Technologies, Inc. is betting that you will want TeleVox to clean up your hopeless organizational mess.

Vox's *Hosage says he is counting on his product's ease of use.*

TeleVox is a device that can store names and phone numbers that are tapped in on a keypad, dumped from a PC, captured from the phone through caller ID service or spoken into a microphone embedded in the device.

It can then dial up any of the numbers at the press of a button.

"If we make it easy and convenient, you'll do it," said Vox President Dan Hosage.

Other companies integrate telephones and electronic databases in desktop computers or network servers.

For example, Siemens Rolm Communications, Inc.'s CommManager includes most of the TeleVox features, plus more, but offers it through a Windows interface. Hosage said his company is counting on users who are not comfortable with that interface.

That could be a significant number of users in the marketplace, according to Don Van Doren, president of Vanguard Communications Corp. in Morris Plains, N.J. He said TeleVox was the only device of its kind he had heard of. "It's certainly one of the early ones," he added.

Although TeleVox will not be ready for market until February or March, the company is already trying to license the technology to phone companies and private branch exchange vendors that may want to incorporate it in their products, Hosage said.

The company plans to introduce a version for fax machines next year.

TeleVox features a qwerty keyboard, 10 special function keys, a four-line LCD screen and a PC

See **TeleVox,** *page 18*

Cisco executives chart firm's SNA battle plan

The test of time has begun. Cisco Systems, Inc., which once fought to squash IBM's SNA/APPN networking technologies, is now geared up to drive some of that Big Blue networking technology on its own.

With its mainframe channel-attached router technology just hitting the market and a newly formed business unit dedicated to attacking IBM's networking space, Cisco is locked and loaded — a welcome position for the folks who run Cisco's IBM Internetworking Business Unit.

But Cisco has had the Systems Network Architecture ball before, only to unceremoniously drop it. The firm's failed Advanced Peer-to-Peer Networking alternative — Advanced Peer-to-Peer Internetworking — and front-end processor-emulation development initiatives are two key examples.

(From l.) Cisco's Selby Wellman, Nick Francis and Cliff Meltzer have their eyes on the IBM SNA networking world.

With those issues in mind, Selby Wellman, vice president and general manager of Cisco's IBM Internetworking Business Unit, Nick Francis, director of product marketing for IBM programs, and Cliff Meltzer, director of IBM engineering, sat down recently with *Network World* Senior Editor Michael Cooney to discuss how the company plans to attack the IBM networking market.

What are the company's greatest challenges in cracking the SNA market?

Wellman: One of the biggest challenges we face is convincing MIS managers that we can integrate SNA and TCP/IP networks. Typically, different parts of IS own those resources, and it's a challenge to get them together. The idea is to get those two areas integrated. Another challenge is convincing users that we can mix SNA and IP on the same mainframe channel and support mission-critical applications.

Francis: TCP/IP is here to stay, but what we have to do is make it more bulletproof. As more users employ it as their backbone technology, we can't tell them that just because it's IP it's OK for it to go down. That won't fly. You can have the best products on the market, but if you can't service them or help users integrate products, it doesn't do much good.

Why do you want to enter a market in which many others, including IBM, are struggling?

Francis: We think that, ultimately, 30% to 50% of our business will come from the SNA internetworking market. The Fortune 500 will most certainly use APPN in the future. We think APPN could be a sleeping giant. What we need now is to add more advanced features, such as High Performance Routing and APPN Border Node support, because

See **Cisco,** *page 18*

Spec may ease path from frame relay to ATM

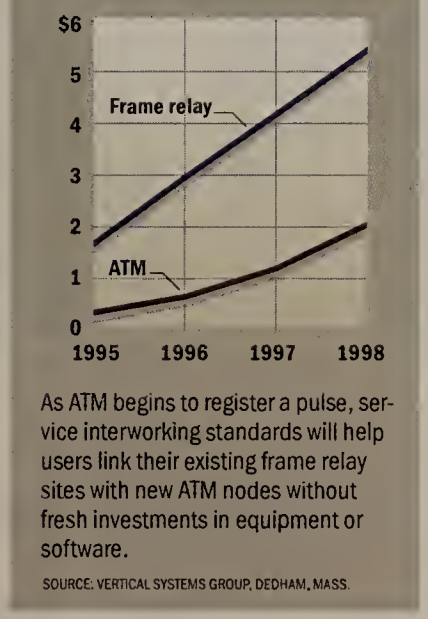
By Joanie Wexler
Foster City, Calif.

Businesses running frame relay traffic and hoping to tiptoe into higher speed Asynchronous Transfer Mode networking will soon have a standard way to make the two types of gear communicate without disturbing their frame relay investments.

The Frame Relay Forum last week said it has ratified the Frame Relay to ATM PVC Service Interworking Implementation Agreement, a software specification for ATM switches with frame relay interfaces.

The software will appear on some switches late this year and will allow translation to and from frames and ATM cells within a carrier's network, said Andrew Greenfield, president of the Frame Relay Forum. "You can have a frame relay node at one end and an ATM node at the other" without the customer's equipment having to do anything special, he said.

Peaceful coexistence



As ATM begins to register a pulse, service interworking standards will help users link their existing frame relay sites with new ATM nodes without fresh investments in equipment or software.

SOURCE: VERTICAL SYSTEMS GROUP, DEDHAM, MASS.

The software will begin appearing on key carrier platform supplier StrataCom, Inc.'s equipment in the first quarter of next year, said Rod Gross, frame relay group marketing manager

See **ATM,** *page 18*

High-speed networking

Agricultural lender extends frame relay to the heartland

By David Rohde
St. Paul, Minn.

Nearly halfway toward completion of a new 400-node enterprise network, one of the nation's principal agricultural lenders is comfortably running both traditional Systems Network Architecture as well as LAN applications over frame relay.

And in the process, AgriBank, FCB is extending the frame relay phenomenon into some of the remotest areas of the country.

AgriBank is using MCI Communications Corp.'s HyperStream frame relay service to enable a variety of WAN applications, encompassing not only SNA, but also TCP/IP, Banyan Systems, Inc. VINES IP and Novell, Inc. IPX traffic.

Sponsored by the federal government, AgriBank is part of the nation's Farm Credit System, serving farmers and ranchers. But pressure in the industry has caused many of the principal agricultural lenders to merge.

AgriBank resulted from the successive merger two years ago of three such lenders, leaving it with a mishmash of multipoint private-line, switched data and X.25 networks connecting the institution with its 30 affiliated regional farm credit banks and several hundred branch offices.

"We knew we didn't want to stay in an SNA-only environment," said Lee Dordal, AgriBank's data center and communications director.

MCI won the contract on the basis of a commitment to help install customer premises equipment and loopback devices at each regional bank and its branches. "We have some pretty remote sites in North Dakota, Arkansas and Missouri," Dordal said. "But we've installed one site per working day through the first six months."

The three-tier, multiple-star network is centered around AgriBank's data center here, with T-1 access lines to four T-1 ports on MCI's frame relay switch.

About a quarter of the regional banks also subscribe to a T-1 port at the MCI switch nearest them, with the rest utilizing 256K bit/sec ports. "Early on, we found that 56K ports at the regional banks were too slow," said Sue Green, a technical analyst for AgriBank.

But the branches are all standardized on 56K bit/sec ports, with permanent virtual circuits (PVC) established between the regional banks at a 16K bit/sec committed information rate.

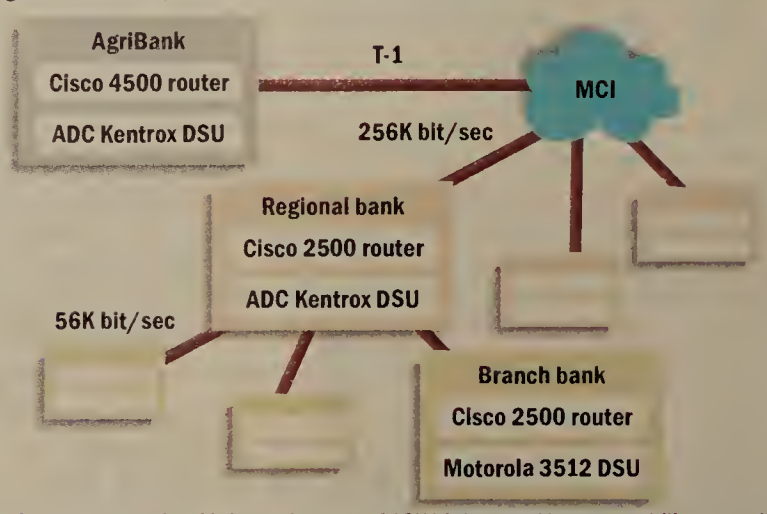
Using the net, the branches can access a traditional loan accounting system on a headquarters mainframe over SNA. And AgriBank has installed a loan origination system on IBM Application System/400 computers in each regional bank, accessible by branches over their PVCs with the regional banks.

The frame relay network has also allowed AgriBank to move toward enterprisewide messaging with Novell's GroupWise application over IPX, while many of the sites with Banyan networks exchange electronic mail over VINES IP.

At the same time, AgriBank has subscribed to an enhanced 800 routing service from MCI. With a single telephone number all customers can be routed to the nearest branch office. ■

Frame on the farm

AgriBank's multiple-star MCI frame relay network:



PVCs with a committed information rate of 16K bit/sec and burst capability up to the port speed of 56K bit/sec run from each branch office to the nearest regional bank, bringing these small offices onto AgriBank's enterprise net.

ATM

Continued from page 17

at the firm. But AT&T, which runs its frame and ATM services off StrataCom platforms, said it is working with StrataCom to meet AT&T's service delivery goal of late 1995.

Like AT&T, LDDS WorldCom runs some of its frame services off StrataCom gear and said it is targeting the first half of 1996 for the service interworking capabilities. Sprint Corp. plans service late this year, and MCI Communications Corp. intends to launch in the first quarter of next year.

Once implemented, such capabilities could help companies — such as medical instrumentation maker Becton Dickinson Corp., an MCI frame relay shop based in San Jose, Calif. — introduce ATM nodes into their enterprise networks at their own pace.

Jeff Schults, manager of Becton's communications network services group, said that because of service interworking, Becton sites that do not yet use high-bandwidth applications "can wait for the [frame relay] capital depreciation before moving to ATM. Or, they might never move to ATM at all."

The service interworking move "empowers network administrators to build nets based on need rather than on what's available," Schults said.

That's not FUNI

The service interworking translation scheme will compete, in a way, with the Frame User-to-Network Interface (FUNI), a nascent ATM interface standard for sending frames end to end across ATM networks.

FUNI has been touted as potentially appropriate for low-speed ATM because it does not waste, on what is comparatively a slow link, a large volume of overhead by chopping frames into cells.

One possible advantage of FUNI is that users can specify most ATM quality-of-service levels regarding network throughput and delay, said Steven Taylor, president of Distributed Networking Associates of Greensboro, N.C.

A second advantage would be for users that need switched virtual circuits, which do not require users to predefine other users they will communicate with, as do permanent virtual circuits (PVC). The new service interworking agreement applies only to PVCs. ■

TeleVox

Continued from page 17

jack. The hone and telephone wall jack are both plugged into the back of the TeleVox unit, which fits under the phone.

A typical entry would include the person's name, company, address and telephone number.

Numbers can get into the TeleVox four ways.

The user can: type them in; store the number of an incoming call as long as the phone line is provisioned with caller ID; store the number of an outgoing call by pressing a "save" button; or dump files of names and phone numbers from a standard PC file.

The unit can hold 1,000 such entries. With the voice recognition model, the name of the called party can be stored in a voice recognition database with a capacity of 100 to 200 names, according to Hosage.

To access a phone number, the user hits the "info" function button and types in the last name of the party to be called or the name of that person's company. The entry will pop up on the LCD, along with the telephone number.

With the voice recognition feature, the spoken name and company affiliation will call up a phone number, which is displayed on the LCD screen.

The user dials by hitting the "call" button while the number is displayed on the screen.

The device will work over standard telephone lines and through PBXs that adhere to Telephony Application Programming Interface (TAPI) standards, according to Hosage.

The price of a basic unit will be $100 to $150. The voice recognition database will cost an extra $75.

✆Vox: (313) 657-9815.

Cisco

Continued from page 17

we are getting requests to build large APPN nets, and Border Node will let that happen.

[Border Node lets users interconnect APPN networks into larger ones. At the recent APPN Implementers Workshop, IBM handed out the specification for Border Node, which it already supports in VTAM and AS/400s, so other vendors could begin implementing it in their products.]

Why do you think it has taken so long for APPN to make an impact on the market?

Meltzer: IBM introduced APPN with no migration path for existing users, which was a mistake, but that's mostly fixed now, and by the end of the year, demand will increase.

Francis: The SNA market has always been slow to develop. A typical SNA sale, from beginning to implementation, takes nine to 12 months. It's complicated and costly. A typical TCP/IP sale takes six weeks. We've had to learn and work within those parameters.

Many analysts believe your channel-attached router is taking dead aim at IBM's FEP business. How do you position it?

Francis: Well, it's a multimillion-dollar target, but we are not in the business of concentrating SDLC lines like the IBM FEP does. That's not what we are after. I think we can bring APPN to the mainframe the way IBM really intended it to be — on a channel-attached router. It's cheaper and faster than the IBM solution. We want to be the Microsoft of the internetworking set.

Do you think there ever will be closer ties with the IBM networking folks in Raleigh?

Wellman: Strategically, we'd like to work more closely with IBM, but the existing brain trust at [IBM] Networking Systems sees no business advantage to working with us.

We will, however, continue to try to build a stronger relationship with the IBM corporation as a whole. ■

BusinessBriefs

IBM announced an Internet World-Wide Web site dedicated to its activities at Telecom '95 in Geneva, which takes place Oct. 3 through the 11. The address is http://www.ibm.com/telecom95/.

In other Internet news, **NetManage, Inc.** last week signed an agreement with Netcom On-Line Communication Services, Inc. to support NetManage's Automatic Internet protocol for online sign-up of new Internet users.

Northern Telecom, Ltd. won a three-year contract to supply its Meridian and DMS-250 digital switches to Concert, the global joint venture between MCI Communications Corp. and British Telecommunications plc. The deal includes a centralized net management system called NetWorks Switch and Traffic Management. The carriers will expand Concert Virtual Network Services, now available in 11 North American and European countries, to additional countries, including those in Asia.

INTERNETWORKING MONITOR

The problem of being permanent

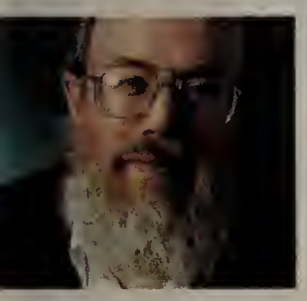
Three predictions were made to the IETF back in 1990: the Internet would run out of some types of IP addresses "soon," the entire 32-bit IPv4 address space would be exhausted soon thereafter, and the rate of growth in the size of the tables in the backbone routers could not be sustained for very long.

The IPng process was started to address the 32-bit IPv4 issue. After quite a bit of discussion, the concept of Classless Inter-Domain Routing (CIDR) was approved to do two things:

- To permit the assignment of blocks of IP addresses sized to more closely match the needs of an organization so that addresses would be more efficiently used.
- To enable the aggregation of routing information from multiple organizations so that the growth of the routing tables could be slowed.

IPng does not, by itself, change the dynamics of the routing table growth.

With CIDR, IP addresses are no longer assigned directly to organizations in the old Class A-, B- and C-size chunks. Instead, large blocks of addresses are assigned to network providers, which then assign parts of these blocks to their customers. If the customer is another network provider, it, in turn, assigns parts of its part to its customers.



Scott Bradner

At the end of this tree, end-user organizations are assigned ranges of addresses that are sized to closely match the organization's actual requirements. This assignment process results in hierarchical addressing, where the topology of the underlying network is reflected in the IP addresses themselves. Hierarchical addressing permits the providers to aggregate the routing information and only advertise the whole chunk of addresses to the rest of the Internet, rather than having to advertise each organization's network addresses.

In theory, this means the routing table in the backbone of the Internet would only require one entry for each of the major network providers. Things are not quite that way in reality, since the Internet does not have a simple tree structure and the use of CIDR-style address assignments is quite recent. The initial address assignments in the Internet were on a first-come, first-served basis, with no concern over network topology.

In addition, many organizations have switched providers over the years, so even if they had been hierarchically assigned, the address structures would not reflect the network topology any longer. Thus, the ability to aggregate the routing information in the Internet is currently somewhat limited, and the routing tables are growing quite rapidly. But even with the current limitations, the use of CIDR has meant that the routing table in the backbone routers contains about 30,000 routes instead of the 65,000 that would have to be accommodated without CIDR.

At this point, it seems that the best way to moderate the growth in the routing tables — which were growing faster than memory technology itself — is to request, but not require, that organizations renumber their networks to match their new place in the network topology when they connect to a new provider.

For large networks, renumbering can be quite a pain and an expense. The IETF is starting a new mailing list (pier-request@isi.edu to subscribe) to look at ways to make this process easier. Note that this means an organization does not "own" its CIDR-style IP address, but since people do not use IP addresses directly, the fact of nonownership should not be an issue, though the pain and cost of renumbering can be — but so would be an Internet that has outgrown the capability to be a connected whole.

Disclaimer: This can't be Harvard's opinion. Harvard does not have an opinion; whenever you have n Harvard people, you have 1.3n opinions. I have 1.4 of them myself.

Bradner is a consultant with Harvard University's Office of Information Technology. He can be reached via the Internet at sob@harvard.edu. He shares this space with Daniel Briere and Christine Heckart, whose column will appear next week.

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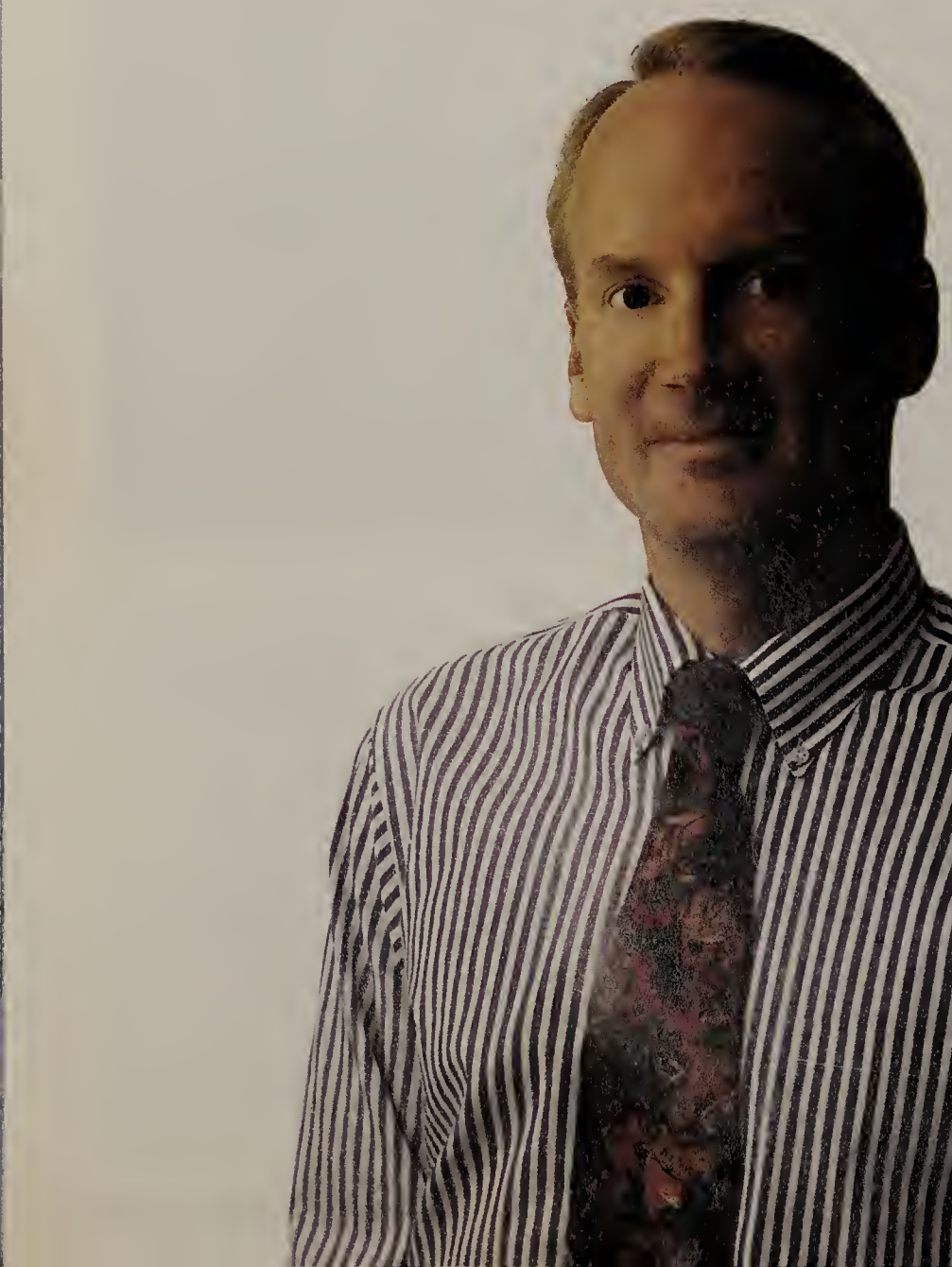

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Briefs

■ **Cheyenne Software, Inc.** *and* **Storage Dimensions** *last week announced a bundle of Cheyenne's Jetserve high-speed* **backup software** *and the Jetarray digital linear tape array. The bundle, designed for single, large servers, can back up data at up to 40G byte/hour in laboratory conditions, Cheyenne officials said. Jetserve, an image-based application that backs up all the data on a server, rather than selecting files from the network operating system directory, can restore data on a volume, system or file-by-file basis.*

The bundle is available through resellers for $1,995 (support for one tape drive) to $17,995 (support for eight drives).

Cheyenne: (516) 484-5110.

■ **Cinco Networks, Inc.** *in Atlanta will demonstrate at NetWorld+Interop this month a Windows 95-compatible* **network monitor and protocol analyzer.** *The product can be used to capture packets and analyze traffic across TCP/IP, IPX and AppleTalk nets. It stores histories of network parameters, and can monitor and display statistics such as packet rate and error rate. The product, currently in beta testing, will cost $995 and be sold through J1 Systems, Inc.*

J1: (800) 671-9272.

■ *Last week,* **Proteon, Inc.** *announced two new* **PCI***-based network adapter cards. The p1690plus-AB has two token-ring PCI ports, and the p1690plus-AA has a single port. The dual-port card can be configured to appear as two LANs running different network operating systems.*

The cards will include drivers for Novell, Inc.'s NetWare 4.X, Microsoft Corp.'s Windows NT, Windows for Workgroups and LAN Manager, as well as DOS Open Datalink Interface and Network Driver Interface Specification.

The dual-port card costs $549, and the single-port card costs $329.

Proteon: (508) 898-2800.

LAN vendors get up and ATM with new products

ZeitNet, Efficient bridge legacy applications and ATM.

By Michael Csenger

Paving the way for Asynchronous Transfer Mode networking across multivendor LANs, ZeitNet, Inc. and Efficient Networks, Inc. have introduced software that lets existing applications take advantage of ATM network features.

ZeitNet's software comprises four parts that work in conjunction with its line of ATM adapter cards for servers and workstations.

Shah *says his product makes for a more manageable and consistent network.*

Z-ATM Stack implements client-side ATM signaling, LAN emulation and other functionality directly on the ATM adapter cards. This eliminates the need to add this functionality via workstation drivers and networking stacks.

Z-ATMinistrator is server-based software that provides the networking elements of LAN emulation, IP support and native ATM support. Putting this technology on the server makes for a more manageable and consistent network than one that requires users to deal with different switch vendors' LAN emulation and other ATM technology implementations, said Amit Shah, ZeitNet's president.

Z-ATMimplementer is a software developers' tool kit that includes prestandard ATM APIs that can be used to build ATM-based applications or upgrade existing applications to take advantage of ATM's advanced capabilities, such as quality-of-service guarantees.

Z-ATManager is a Windows- and NetWare-based tool for managing applications over an ATM network.

Don Spalinger, vice president of worldwide telecommunications for Dataquest, Inc., a San Jose, Calif., consultancy, said ZeitNet is "the only vendor I know of that has so clearly framed an approach for migrating existing applications to ATM."

Spalinger said ZeitNet's success will depend entirely on teaming up with influential players, noting that Cisco Sysems, Inc. and Network General, Inc. have both signed on as partners.

"Many people agree that in the long run it is software, not hardware, that will make or break ATM," he said. "ZeitNet is

See **Legacy,** *page 26*

CrossComm, Agile help Ethernet users edge onto backbones.

By Michael Csenger

Where Ethernet meets Asynchronous Transfer Mode users can choose from two distinct hardware approaches typified by new products from CrossComm Corp. and Agile Networks.

CrossComm this week will introduce modules for its chassis-based XL product family, which combines LAN and WAN modules in an enterprise hub architecture.

ATM Edge Switch (AES) module is a 24-port ATM edge device that connects as many as 24 Ethernet ports to a single ATM trunk.

It converts Ethernet packets to ATM cells and forwards them over an ATM trunk. CrossComm will add standards-based LAN emulation support by year-end, providing basic Ethernet-to-ATM interworking with any LAN emulation-compliant switches.

At NetWorld+Interop in Atlanta later this month, CrossComm will also introduce an ATM LAN backbone switching module, said Gary Wood, CrossComm's director of ATM and LAN switching.

See **Ethernet,** *page 26*

Agile, CrossComm put ATM on the edge

Company/product	Function	Price	Availability
Agile's ATMizer 121 Ethernet Switch	Connects as many as 12 Ethernet segments to an ATM backbone. Can be upgraded by adding a six-port ATM switching module.	$22,000	Now
CrossComm's Ethernet Segment Switch (ESS)	LAN switching and virtual LAN management among 16 to 32 Ethernet segments. ESS is a module that fits in CrossComm's XL chassis line.	$11,995 for 16 ports, $15,995 for 32 ports	End of September
CrossComm's ATM Edge Switch (AES)	Connects as many as 24 switched Ethernet ports to an ATM trunk, with on-board RMON capabilities for per-port traffic monitoring and management.	$19,995	November

Network Appliance fires up faster file server

By Bob Brown

Mountain View, Calif.

Network Appliance Corp. (NAC) this week will roll out a dedicated file server that runs more than twice as fast as the company's existing flagship model.

The company also disclosed plans to move beyond the dedicated file server market over the next 12 months to help users better integrate their application and file servers.

Cheena Srinivasan, product-line manager for NAC, said the company has plans to include Windows NT protocol code in its servers to provide users with improved file-serving capabilities in Microsoft Corp. environments. Further details were not available.

But the company did provide details on its new NetApp F330, which like the rest of the company's systems, runs a proprietary operating system designed specifically to run Network File System (NFS) operations. The operating system is integrated with NFS and Redundant Array of Inexpensive Disks (RAID) Level 4 technology to ensure fast data access.

NAC officials said that the company's servers give users faster response times than Unix-based file servers. The Pentium-based NetApp F330 boasts throughput of 1,143 NFS operations at 10-msec access times and is designed for both departmental and enterprise environments.

It is 2.5 times as fast as the company's previous model, the 486-powered FAServer 1400 workgroup system.

The NetApp F330 includes nine PCI slots that can house a variety of network and storage connections. Network interfaces supported include 10Base-T, 100Base-T and Fiber Distributed Data Interface. The previous model featured an EISA bus.

Company: Network Appliance
Founded: 1992
Based: Mountain View, Calif.
Employees: 75
Primary business: Dedicated file servers
Future direction: Will examine the need for dedicated access servers in Windows NT, Web and video application environments
Financials: $14 million in revenue for fiscal year 1995; the company is privately held

The new server also differs from the previous one in that the NetApp F330 has an 80G-byte storage capacity compared with 52G bytes for the older model.

Paul Canning, vice president of network services at NationsBanc-CRT in Chicago, said his company is beta-testing the new systems and has been impressed enough that the firm may add some of them to NationsBanc-CRT's mix of about 30 NAC servers.

The options and futures trading firm uses its existing NAC servers for flat file storage and more.

Canning said the NetApp F330's 90-MHz Pentium processor could make the server powerful enough to suit end users at the company who need particularly fast data access and system recovery.

NetApp F330 starts at $48,000 for an 8G-byte system.

✆NAC: (415) 428-5100.

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Software, peripheral vendors ride Windows 95's coattails

By Peggy Watt
Redmond, Wash.

A Ferris wheel and carnival tents provided a county fair atmosphere for Microsoft Corp.'s introduction of Windows 95, but more than 100 third-party vendors hawked software and peripherals, not Ginsu knives.

FTP Software, Inc. of Andover, Mass., is shipping InterDrive 95, a 32-bit Network File System client that applies a multithreaded Virtual Device Driver to give Windows 95 users what appears to be dedicated access to servers running network operating systems, including Banyan Systems, Inc.'s VINES, Novell, Inc.'s NetWare and even Microsoft's LAN Manager.

"InterDrive integrates with the Windows 95 interface, so the performance is there, but the product is invisible to users," said Rebecca Floyd Buisan, an FTP Software product manager.

InterDrive 95 can work with either Windows 95's built-in TCP/IP kernel or FTP Software's OnNet for Windows 2.0, a collection of network utilities based on a 32-bit TCP/IP kernel.

InterDrive 95 costs $249. A Windows NT version is scheduled to ship this month.

Other Windows 95-compliant products introduced included:

■ CDexecutive/XF, a CD-ROM network server from Logicraft Information Systems, Inc. of Nashua, N.H. A CDexecutive/XF was the server for 14 networked CD-ROM applications showcased at the Microsoft product introduction.

The server lets users mount or store CD-ROM applications by clicking on a program icon.

The Pentium-based CDexecutive/XF runs Windows NT on a tower server housing as many as 14 CD-ROM drives in one chassis and comes with Windows 95-based server management utilities. The modular hardware can be expanded to handle as many as 56 drives. Pricing begins at $21,000 for the server plus $3,000 for software.

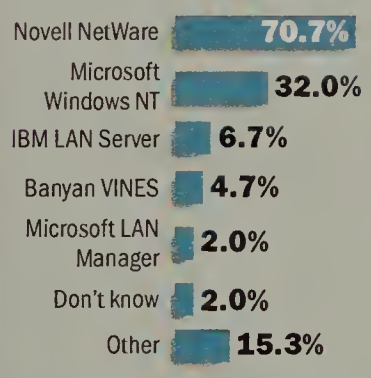
■ WinShield, which adds to a network manager's configuration controls for Windows 95 desktops by letting managers keep users from accessing designated drives or files. The $49 product is scheduled to ship this month from Kent-Marsh, Ltd. in Houston.

■ Dashboard 95 and Sidekick 95, which modify and customize the Windows 95 interface, are shipping now from Starfish Software, Inc. of Santa Cruz, Calif. Dashboard 95 lets users reorganize their Windows desktops and implement hot keys to launch or switch among applications. Sidekick 95 adds new utilities, such as an expense report form view and rich text editor; it also uses Microsoft's Telephony API to link the telephone dialer to utilities such as a contact manager and card file. Each product is priced at $49.

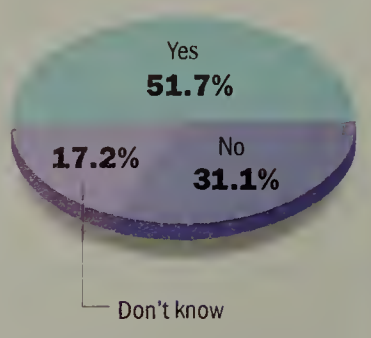
✆FTP Software: (508) 685-4000; Logicraft: (603) 880-0300; Kent-Marsh: (800) 325-3587; Starfish: (800) 765-7839.

A SAMPLING OF WINDOWS 95 SURVEY RESULTS

What network operating system will Windows 95 attach to?
(More than one response allowed)



Do you consider Windows NT Workstation a viable alternative to Windows 95 on the desktop?



Results are based on a survey of 151 users interviewed by Focus Data of Framingham, Mass.

Legacy

Continued from page 23

the first to really move ahead on that front."

Z-ATManager and Z-ATM Stack are bundled with ZeitNet's software media kit, which is shipping with ZeitNet adapters now for a cost of $89. Z-ATMimplementer and Z-ATMinistrator will be available in October for $500 and $3,995, respectively.

Getting Efficient

Efficient, which also sells ATM adapter cards, has introduced LAN Emulation Server Software based on the ATM Forum's LANE 1.0 specification.

In conjunction with LAN emulation client software on the adapter cards, LAN Emulation Server Software handles the network functions of legacy LAN and ATM interworking.

In addition, it supports RFC 1577 for classical IP over ATM networking.

Efficient's LAN Emulation Server Software runs on a Sun Microsystems, Inc. server equipped with Efficient's SBus ATM adapter card.

Available now, the software costs $9,995.

✆ZeitNet: (408) 986-9100; Efficient: (214) 991-3884.

COMMENTS?

See "How to reach us" on the Opinions pages.

Ethernet

Continued from page 23

CrossComm is also introducing the Ethernet Segment Switch (ESS) module, which is a LAN backbone device being offered with either 16 or 32 10Base-T ports.

It will link servers, hubs and other devices carrying heavy loads and, as an option, can be configured with two 100M bit/sec Ethernet ports.

The RMON keys

Key to CrossComm's architecture is the fact that Remote Monitoring capabilities are incorporated into each LAN and ATM switch port. This allows flexible management and analysis of any port in a CrossComm network without the need for external sniffers and analyzers.

Agile's version of an ATM edge device is the ATMizer 121, with 12 switched Ethernet ports connected to either one or two ATM trunks.

Unlike CrossComm's offerings, the 121 is a stand-alone device that performs local LAN switching plus ATM concentration. The 121 is essentially a stripped-down version of Agile ATMizer 125, which includes a six-port ATM switching component along with the same 12 Ethernet ports.

Users can upgrade a 121 to a 125 by opening the box and adding an ATM switching card for about $16,500, said Bill Seifert, Agile's president.

✆CrossComm: (508) 481-4060; Agile: (508) 263-360.

NET RESULTS

My vendor's been acquired and I can't get product

With the second year of LAN industry consolidation behind us and start-ups being snapped up before they ship product, the industry has undergone an interesting change. Caught in the search for a total solution, companies such as Cisco, 3Com and Bay Networks are like white sharks in a school of herring.

Skip MacAskill and Melinda Le Baron

So how does this acquisition bonanza affect users?

Let's take a look at the mythical Flying Networks, an Ethernet hub and switch vendor. In the past year, it has purchased a token-ring hub and switch company, an FDDI hub supplier, a low-end routing company, an ISDN wide-area/remote office vendor and an Asynchronous Transfer Mode switch company.

That makes five companies in 12 months, and each has its own form of distribution (two have direct sales forces, two have tiered distribution and one uses the OEM track). All have their own network management applications that run on assorted platforms.

Flying Networks has an incredible challenge in front of it: It must integrate the various offerings into a coherent product line.

There are product overlaps between the low-end routing company and the ISDN wide-area firm. No two user interfaces resemble each other in the slightest. Some support the Simple Network Management Protocol, but only three have the full Management Information Base set that's needed to be competitive. None have implemented Remote Monitoring, and some cannot due to hardware capacity.

Then there are the personnel issues Flying Networks faces: retaining employees, working with new employees across long distances, extra travel, different perspectives and working environments, and potential layoffs due to job overlaps.

Pretty daunting, and that only represents the issues involving the business logistics of those acquisitions. While all that is being addressed, Flying Networks must try to decide what new products need to be developed, what technologies to include in its product portfolio and whether or not to make good on the promised functions and product upgrades that users of the acquired companies are expecting.

Ah, the actual users, nearly forgot about them. If a user's main vendor gets acquired (or even if a user's main vendor is the acquiring company), three main issues should be tracked carefully.

■ **Product overlap.** What, if any, product overlaps exist when companies merge? How will the company in charge decide what stays and what goes? What type of swap-out program will the company offer users for products being discontinued?

Despite the best assurances of the acquiring company, expect some product sets to be eliminated.

■ **Network management integration.** How will the company integrate the different network management applications into one package? How long will it take? What about upgrades to existing management applications?

Be prepared to use separate, nonintegrated management applications for at least the next year.

■ **Long-term strategy.** How do the long-term strategies of the two companies compare? Do they have synergistic ATM migration plans, for instance? How will the merged companies decide what product sets get development dollars? Will the new company vision allow you to stick to your own long-term network plans?

Mergers and acquisitions provide a good opportunity for users to reevaluate some of these issues and look to other vendors for alternatives.

MacAskill is a senior research analyst and Le Baron a research director for Gartner Group, Inc.'s Network Computing Infrastructure group. They can be reached at (203) 967-6700.

Commerce

Continued from page 1

ing standards. Additionally, security — especially on the Internet — is becoming a major stumbling block, as is the lack of affordable, high-bandwidth access services in the local loop (see story, this page).

Through it all, an organizational hurdle lurks in the background, as most roundtable participants said their company had no clearly defined individual or group charged with setting electronic commerce policy. Typically, corporate management or marketing departments race to the IS department with last-minute demands.

Roundtable participants unanimously agreed that industry-specific standards for such things as electronic forms, E-mail, EDI and network transport were critical in getting electronic commerce off the ground.

The lack of such standards in the automobile industry puts suppliers largely at the mercy of their customers' demands for how to conduct electronic commerce, said Margaret Hvatum, network administrator at Boston-based Pollak Electromechanical Products, Inc., a supplier of components to Chrysler Corp., Ford Motor Co. and General Motors Corp.

Pollak's *Hvatum says the lack of standards in the auto industry puts suppliers at the mercy of their customers' demands for how to conduct electronic commerce.*

"Each of the Big Three has a different standard for how you do it, which value-added network you use and which software you use," she added.

The insurance industry has found that exchanging claims forms and other documents electronically was impossible until the industry developed its own protocols a few years ago, according to Kaiser Majid, director of planning for information systems at Commercial Union Insurance in Foxborough, Mass.

Commercial Union's primary trading partners are the roughly 2,000 independent agent offices across the U.S. that submit paperwork concerning their clients' life and property insurance.

Insurance-specific standards, such as AL3, let agents file claims with any insurance carrier, Majid said.

Insurance companies also have to report claims statistics to government agencies, and in this area, electronic filing through EDI is starting to occur.

"We report the statistics in ANSI X12 format to the states of Illinois and Texas," the first states that seem to be prepared to receive the information in EDI form, Majid said.

Standards for medical records and billing forms are emerging, but much more work needs to be done to solve critical interoperability problems, according to Robert Beckley, director of IS at Boston's Brigham and Women's Hospital.

"We're behind most industries in passing information back and forth, probably because medical services have traditionally been delivered within one institution," he said.

With the managed care movement, those days of isolation are over, and obtaining authorizations for medical services is becoming more important. "We have to do more communicating with insurers," Beckley added.

Under a program with Blue Cross/Blue Shield, Brigham and Women's can now check patient authorization on a real-time basis by putting the patient's Blue Cross magnetic stripe card through a point-of-sale device at the hospital. "It instantly creates an electronic claim for Blue Cross," Beckley said.

In addition, the hospital recently began buying supplies via EDI from Baxter Healthcare Corp.

For those steering the corporate ship ever-further into cyberspace, the Internet offers the allure of a ubiquitous data network reaching ever farther across the world.

Security and the 'Net

But no one at the roundtable was willing to entrust critical data to the 'Net.

"The reason we're all not using the Internet is security," Beckley explained.

Brigham and Women's stores patient records in electronic form, but such data is too sensitive to consign to the Internet, he added.

The auto industry might benefit from greater use of the Internet, according to Hvatum. For example, it would be simpler for her company to use the Internet rather than three VANs, one for each of the Big Three automakers.

Again, security has stalled progress, although she noted that adoption of uniform encryption software standards might address that problem.

Pollak does exchange CAD files over the Internet with customer John Deere Co., citing that as the kind of low-risk application for which the 'Net is already useful.

Web promise

Likewise, all the roundtable participants were bullish on the Web for applications where security was not of particular concern. Each said they now routinely access public Web sites to download vendor software patches or pick up marketing information.

Brigham and Women's *Beckley says there's still a lot of work ahead to solve critical interoperability problems for medical records and billing.*

Fidelity Investments has set up both an Internet-based Web site for sharing information with the public and a private corporate Web site that makes it relatively simple for different divisions to keep track of what others are up to.

"As a corporation encompassing about 30 different companies, this helps us stay informed about what we're all doing," said Bill Niemi, technology consultant at Fidelity in Boston.

Fidelity has also ventured onto the Internet with a Web page that contains marketing material about financial products and services. "We recently started receiving resumes over the Internet, too," he said.

Still, while tools such as the Web and, in general, data communications comprise an ever-growing component of electronic commerce, the telephone remains the staple technology for companies such as Fidelity.

"We get over 300,000 customer phone calls per day," Niemi said. "Now people are using voice response units to place trades."

On-line data communications is growing — but slowly. Fidelity has designed PC-based software for traders, but its popularity is limited to the most serious techies, he added.

The investment house, which has a large 401(k) business with corporate clients, has also developed software that lets clients log on from workstations to see how their plan is doing and shift shares from one fund to another.

Similarly, at Commercial Union, nearly 40% of all communication is conducted via phone, fax or mail, according to Majid.

Local-loop drag

All roundtable participants agreed that a key stumbling block to lowering that figure is the local loop. Getting more consumers and small businesses to use resources such as the Internet (and especially the Web) means getting ubiquitous access to low-priced, high-bandwidth links.

ISDN Basic Rate Interface lines are probably the best bet on that front, but most consumers don't even know they exist, and it is questionable whether they could get them anyway.

"We've gone hunting for BRI across the nation," Majid said. "It's getting better, but it's still disappointing."

Keeping track of these myriad issues to formulate an electronic commerce strategy is an issue in itself. But only Brigham and Women's appeared to have a task force focused solely on electronic commerce.

According to most participants, the established MIS department sets goals, following the lead of upper management or marketing.

"The marketing department defines the need, but the MIS department carries it out," said Pollak's Hvatum. "I try to think of what they will ask me to do, and I also begin discussions with Chrysler, Ford and GM about what their demands may be."

At Fidelity, defining electronic commerce strategy is left up to each of the 30-some business units, Niemi said. They formulate plans in conjunction with their own IS department, while using the internal Web sites to exchange information.■

A new model for a new era

Researchers observing the dawn of network-based transactions across the Internet say a new model of commerce is appearing, but it's clouded by the bandwidth limitations faced by consumers and small businesses.

"What's cropping up is this notion of a network-facilitated or a network-brokered transaction," said David Carver, associate director at Massachusetts Institute of Technology's Center for Technology, Policy and Industrial Development. He participated in *Network World*'s electronic commerce roundtable. "We're in a transition from a two-party model to a three-party model."

MIT's *Carver says the choice of local access is limited.*

Traditional purchases rely on a simple exchange between the buyer and seller. But the future of electronic commerce is likely to involve a network-based intermediary as an active third party that markets, sells and bills for products and services, Carver added.

Like other roundtable participants, he agreed that one of the main barriers to electronic commerce is that affordable, high-bandwidth local services are not widely available.

The problem is that telecommunications services are not on the kind of technological curve that computers are, pushing toward ever greater performance without sharper prices.

"Local access is the barrier to getting the network to the little guy in the house, the small business, the school," Carver said. "Your choice of access is limited, and the kind of communications we get is primitive. And it is rather expensive."

Other barriers to electronic commerce include the problem of copyright violation when publications can be reproduced and transmitted at the touch of a button.

For those that want to sell copyrighted information electronically, some technical protections exist, such as digital watermarks and even network sniffing, to see if the recipient of the information forwarded it illegally to someone else.

"What goes unnoticed is that the more you use these things, the more you stop the free flow of your information," Carver said. "That's going to impair your business."

New ideas need to be explored, Carver emphasized, such as finding ways that a person who wants to receive a copy of a transmitted document can have his account in cyberspace credited for a stipulated amount.

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Briefs

■ *Last week, the* **Open Software Foundation, Inc. (OSF)** *announced that* **David Tory,** *the group's president, will resign Sept. 15. No reason for the decision was given. The OSF's board of directors will discuss finding a successor at its Sept. 14 meeting.*

■ **Visible Systems Corp.** *of Waltham, Mass., last week unveiled a version of its Visible Analyst Workbench client/server* **computer-aided software engineering tool** *that supports the Rumbaugh object-oriented development methodology. It also includes an interface to Unify Corp.'s Vision application development environment. The new release will ship by year-end and is priced starting at $1,500 per concurrent user.*

Visible Systems: (617) 890-2273.

■ **PageAhead Software Corp.** *of Seattle last week announced SimbaExpress, new client software based on the* **Open Database Connectivity (ODBC)** *protocol for accessing SQL and non-SQL databases. SimbaExpress can access data concurrently from several databases using only one ODBC driver and one communications driver. Client software installation and maintenance can be controlled from the server. The product will ship in October with drivers for Oracle Corp. and Sybase, Inc. databases.*

To add additional data sources, administrators may install any ODBC-compliant driver and the server. Pricing information was not disclosed.

PageAhead: (206) 441-0340.

■ *This month,* **Blueridge Technologies, Inc.** *of Flint Hill, Va., will ship a version of its* **Optix Network Document Management System** *for Sybase, Inc. SQL Server databases. The Unix-based Optix server handles workflow, document imaging, archival and retrieval, and text search for both Windows and Macintosh clients. Pricing starts at $125,000.*

Blueridge: (540) 675-3015.

Workflow vendors eye the Internet

By Barb Cole

Banking customers soon will be able to monitor the loan application approval process over the Internet if workflow vendors get their way.

And banking is just one vertical market that could benefit from tighter links between workflow systems and the Internet that will start to emerge in products that will be rolled out during the next six months, according to workflow software vendors.

UES, Inc. of Dublin, Ohio, by year-end will ship an add-on to its KI Shell workflow software that lets users kick off workflow tasks over the Internet. Separately, Raleigh, N.C.-based Ultimus by the first quarter of 1996 will ship a version of its workflow software that includes a World-Wide Web browser, letting users launch processes via the Internet. Around the same time, Portfolio Technologies, Inc. plans to release its Office.IQ workflow-enabled document imaging system with Internet hooks.

Eager to give it a try

Users are eager to give workflow a whirl over the 'Net.

"I definitely see the potential for using workflow in conjunction with the Internet," said Jonathan Vaughn, vice president of applied technology at The Chase Manhattan Bank Corp. in New York, which recently purchased a 275-user workflow and imaging system for the company's credit card division.

Workflow software automates business processes, routes work through an organization and, with the help of a database or an electronic mail system, tracks the status of work in progress.

Until now, workflow systems have primarily been used in departments or small workgroups, but analysts predict workflow technology will be extended across enterprises via the 'Net in coming years to support links among remote sites and between trading partners.

Mail-enabled workflow systems, such as Ultimus, may get some help from Microsoft Corp. in making intercompany workflow possible over the Internet. The software giant recently announced plans to extend its Messaging Application Programming Interface (MAPI) to include workflow extensions.

UES, on the other hand, is designing a protocol based on IBM's Distributed System Object Model to let workflow systems interoperate over the Internet.

Some workflow firms, such as Recognition International, Inc. of Dallas, have already started working with customers to deliver Internet-based workflow applications but do not plan to offer prepackaged 'Net links.

Some of the workflow industry's largest players, such as FileNet Corp. and Action Technologies, Inc., are considering Internet links but declined to comment about specific plans.

"The Internet could provide the communications infrastructure needed to automate all sorts of business processes, which is what workflow is all about," according to Bruce Waddington, FileNet's senior vice president of engineering.

Analysts said no matter what form they take, workflow systems will eventually become Internet-enabled.

"It's inevitable that workflow vendors offer customers links to the Internet, but they are being somewhat quiet about it because workflow over the Internet is not where the sales are for them today," said Connie Moore, an analyst at BIS Strategic Decisions. ■

Making work flow over the 'Net

Company	Workflow/Internet plans
Portfolio Technologies	Will ship by 1Q 1996 an Internet-enabled version of its Office.IQ workflow and document imaging system.
Recognition	Will support the Internet as an alternative E-mail system in its Floware software to let users trigger workflow applications from the 'Net.
UES	Plans a 4Q release of Track-IT, an add-on to its KI Shell workflow system that will let users share documents and trigger workflows via the Internet.
Ultimus	Will roll out a version of its Ultimus workflow software in early 1996 that includes a Web browser from which users can launch workflow processes over the Internet.

Tool set blends spatial, corporate data across nets

New object-oriented Object/FX application software developers' tool kit is now in beta.

By John Cox
St. Paul, Minn.

Beta users are testing a new tool kit that lets them visually picture and analyze a wealth of corporate data in networked databases.

Object/FX Corp.'s SpatialWorks is a set of object-oriented components designed to incorporate geographic information systems (GIS) capabilities into new or existing client/server applications. Traditionally, such GIS programs have been standalone host or desktop packages that cannot easily make use of corporate data, company officials said.

The company's new SpatialWorks Visual Companion Object Developer's Kit is a Smalltalk class library that can be incorporated in a fully object-oriented application. The Smalltalk tools are based on the VisualWorks visual programming environment from ParcPlace, Inc.

The tools join Object/FX's existing Visual Companion Integrator's Kit, which is also written in the Smalltalk object-oriented language. But the Smalltalk code is encased with a messaging scheme and an API that can be called by both third-generation programming languages and client/server tools such as Visual Basic.

The new tool kit is being used by RWD Tecnhnologies, Inc., a Columbia, Md., professional services firm, to create a prototype dispatching and routing system for a package delivery firm, said Wayne Elias, principal systems engineer for RWD.

By clicking on map locations, dispatchers can see data such as a customer's address and the number of packages to be picked up.

"We can turn real-time data into a geographic visualization and let users interact with it," according to Elias.

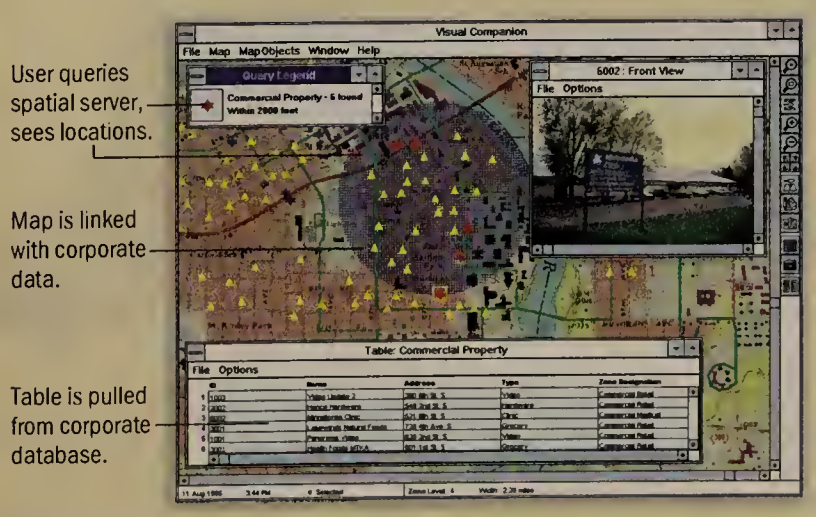
A key component of the SpatialWorks product line is a tool called Object Mapper, which associates corporate information with a spacial database and stores the result in a networked object-oriented database.

Version 1.0 of the Object Developer's Kit will be released Oct. 1 on Unix, Windows, Windows NT, OS/2 and MacOS. The client/server development license costs $4,495, a five-user deployment license is priced at $2,475, and the server deployment license costs $3,995 per server.

✆Object/FX: (612) 644-6064.

Working with SpatialWorks

Object/FX's new set of software components let application developers link spatial databases with corporate data on the network.



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GNAWED LOGIC

Mike Rothman

Secure applications: a good idea, but when?

I am always surprised that security is something networking professionals have never really gotten their arms around.

Most network folks do enough to cover their butts and keep the EDP auditors off their backs, but I haven't seen many spend big bucks for bulletproof security systems.

Sure, they secure information within specific platforms, such as their NetWare servers or IBM mainframes, and they also clamp down on easily compromised network access points, such as remote dial-in links, Internet access connections and wiring closets.

This piecemeal approach has worked OK and made security product vendors, such as Cylink, Security Dynamics and Mergent International, fairly large companies. But it hasn't really eradicated the overall security problem.

Let's look at a not-so-hypothetical example I ran into at a client site. This client needs to provide one of its larger trading partners with real-time access to a highly sensitive corporate database. By real time, I mean electronic data interchange will not cut it.

The company needs to secure the network access, block access to private parts of the database, encrypt data sent over the network and in some way authenticate the trading partner.

Just a walk in the park, eh? Not really. To put this type of end-to-end security system into place cannot be solved with a piecemeal solution.

This user needs an all-encompassing security architecture, as opposed to a collection of security products — something that's sure to bring smiles to the dreaded auditors.

This need is not lost on some vendors, such as NorTel and Motorola, which have articulated enterprise security architectures to create trusted applications and networks.

All the buzzwords are there: X.500 directories, X.509 certificates, lightweight client software for multiple platforms, multiple server platform support and public/private key encryption.

So, what's the holdup?

Price and critical mass. These solutions cost upwards of $200 per head. The auditors carry lots of weight, but not that much. This price point puts it out of reach of almost everyone, except Bill Gates and the Sultan of Brunei.

Also, before any architecture is complete, critical independent software vendor support will be required for strategic pieces of the infrastructure.

I maintain that an enterprise security service is just not possible until it's an extension of the core network and computing technology infrastructure, not just an afterthought add-on to cover hind sections.

That means desktop operating systems, access APIs, enterprise directory services, back-end network operating systems, electronic mail and database servers, and external networks must become security-aware.

Of course, if you buy all your stuff from one vendor, interoperability and adherence to security paradigms isn't an issue. But how many organizations are like that? Probably fewer than the number of hate letters I received for my last column (thanks for your support).

So until the industry heavyweights like Microsoft, Novell and IBM play ball, this utopian security service is largely a pipe dream. And that's really a shame because such services will make the world a safer place to compute.

Rothman is a vice president of META Group, Inc.'s Global Networking Strategies service in Reston, Va. Feedback is welcome either by E-mail at miker@metagroup.com or by telephone at (703) 860-6600. Rothman's column alternates in this space with that of Marc Myers, president of Client/Server Connection, Ltd.

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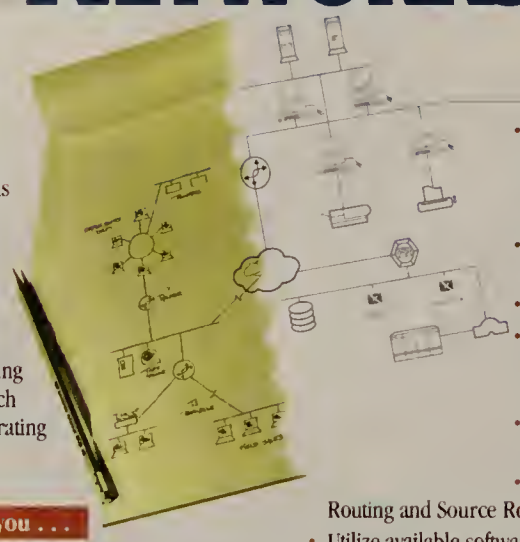
Internetworking: DESIGNING LANs, WANs & BROADBAND NETWORKS



The ever-changing internetworking landscape, fueled by emerging broadband technologies, dramatically challenges traditional LAN and WAN architectures. Network professionals must now integrate local and wide-area networks with new technologies including fast Ethernet, ATM, frame relay and SMDS. These and other new technologies hold the promise of more efficient and ever-faster communications across enterprise networks.

Directed and taught by Mark Miller, author of seven best-selling books on internetworking technologies, this seminar will teach you how to architect and implement multiprotocol, multioperating system internetworks that seamlessly integrate legacy and emerging technologies.

This information-packed two-day seminar will help you . . .

- Evaluate internetworking hardware and software solutions for optimum network design and performance, and review over 40 available products
- Analyze repeaters, bridges, switches, routers and gateways to determine which one is appropriate for particular applications
- Prepare for the next generation of internetworking challenges: Frame relay/SMDS, frame relay/ATM and SMDS/ATM connections
- Understand key internetworking protocols, such as TCP/IP, IPX/SPX, X.25 and XNS
- Determine bandwidth requirements for both leased line and broadband circuits utilizing traffic studies
- Troubleshoot your environment through case studies that detail protocol operation, and illustrate typical internetworking problems and solutions, including Ethernet fragments, the token ring route discovery process, and FDDI station management
- Understand the key internetworking features of AppleTalk, Banyan VINES, NetWare, OS/2 LAN Server and Windows NT
- Discover some key applications for narrowband ISDN technology
- Compare the technologies and operation of ATM, frame relay and SMDS, and discover the role of the broadband implementers: the Frame Relay Forum, the ATM Forum and the SMDS Interest Group
- Understand the detailed operation of Ethernet, IEEE 802.3, token ring and FDDI, and key performance characteristics of these technologies
- Evaluate the differences between Transparent Bridging, Source Routing and Source Routing Transparent Bridging internetworking standards
- Utilize available software tools in the network optimization and modeling process
- Examine application gateways that connect LANs, minicomputers and legacy systems
- See how SNMP plays a key role in internetwork management including the management and operation of broadband networks
- Understand the operation of IP-based routing
- Match the appropriate LAN application with the WAN broadband technology
- Understand TCP/IP and the Internet protocol suite, including ARP, ICMP, UDP, SMTP, TELNET and FTP
- Explore the internetworking challenges of remote access and wireless communications

Locations and Dates

Boston, MA	October 16–17	Irvine, CA	January 17–18
Denver, CO	October 19–20	Dallas, TX	February 12–13
Atlanta, GA	October 25–26	New York, NY	February 27–28
Washington, DC	November 2–3	Philadelphia, PA	March 12–13
Chicago, IL	November 28–29	Orlando, FL	March 14–15
San Francisco, CA	December 5–6		

$895 Registration Fee Includes . . .

- Comprehensive seminar workbook
- Copy of best-selling *Internetworking*, 2nd edition, by Mark A. Miller
- Four exclusive protocol reference guides: Ethernet, Token Ring, FDDI and LAN Cabling
- Valuable course diskette containing reference information on internetworking implementation, documentation and standards
- Free 6-issue subscription to *Broadband Networking News* — the leading newsletter for news and analysis on broadband networks

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Business News & Analysis of Frame Relay, ATM, and SMDS

- Luncheon and break refreshments

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Briefs

■ **Netscape Communications Corp.** *this fall will release a version of its Netscape Navigator software to run with Microsoft Corp.'s* **Windows 95.** *Netscape has also released a beta version of a new product called SmartMarks that lets users monitor selected Internet addresses or URLs, and organize content into customized desktop folders. The public beta version of SmartMarks can be downloaded from http://home.netscape.com.*

■ *This month* **Ipswitch, Inc.** *will ship CyberSuite,* **Internet access software** *priced at $95 that bundles Windows 95, Windows NT, a TCP/IP stack, telnet, mail and file-transfer client software, and runs them from a single graphical user interface.*
Ipswitch: (617) 676-5700.

TRADEWAVE

■ **TradeWave Corp.,** *a spin-off of the government-funded consortium EINet Corp., said that by year-end, it will ship a line of* **public-key encryption software** *products, called TradeSecret, and operate a certificate authority service for linking the user's identity with public-key software.*
TradeWave: (512) 433-5325.

■ **CyberSource Corp.,** *which operates software.net, an Internet-based electronic distribution channel for software, has opened a product center where vendors can* **market Windows 95 products.** *Go to http://software.net on the Web.*

■ *El Al Israel Airlines said it will begin using* **EDI for Administration, Commerce and Transport (EDIFACT),** *in addition to proprietary EDI formats, in exchanging air cargo information with freight forwarders. The airline will use the Windows-based EDI software tool Mercator from TSI International, Inc. to process both EDIFACT and other EDI messages.*
TSI: (203) 761-8600.

Hurdles stand in way of electronic checking

By Ellen Messmer
New York

In the future, we won't be saying the check is in the mail. We'll be saying the check is in the network.

That's if the Financial Services Technology Consortium (FSTC), a group of 65 banks, high-tech firms and government agencies, succeeds in either of its two efforts to process electronic versions of checks.

But both efforts — the first called the electronic check project and the second, the check-imaging project — face technical and legal hurdles before they become a mainstay of electronic commerce.

"We're trying to create a standard format that everyone can agree upon and use to exchange an electronic check between a buyer, the retailer and the banks, with the check clearing through banking channels," said Frank Jaffe, the FSTC electronic check project manager and senior systems consultant at the Bank of Boston.

Hardware-based spec

The FSTC, which plans to have a working demonstration of its electronic check ready this fall, is basing the specification on hardware, such as PCMCIA cards and smart cards, rather than software.

This hardware focus is due to security concerns. "Hardware is less prone to tampering than software," Jaffe said.

Public-key encryption technology built into the electronic check hardware would let buyers, after keying in their passwords, authenticate their identity to merchants when buying products over a network or in stores.

Once the electronic check reaches the banks — whether over the Internet, on-line services or through networks such as those used for today's automated teller machines — the banks would clear it to settle accounts.

The concept is simpler than the implementation. The FSTC is still grappling with the complex problem of public-key certificate issuance to connect the user's identity to a certain encryption key, Jaffe said. By having a hierarchical certificate-issuance system the banks and government could agree upon, fewer public keys would have to be distributed.

When processing from bank to bank, the FSTC is not sure whether it will be necessary to transmit the entire electronic check information or simply its critical pieces, such as the check number, date and the public key with which it was signed.

The second FSTC effort, the check-imaging project, is based on the idea that banks will be able to scan in images of paper checks they receive in order to send them electronically, instead of hauling paper checks between banks as they do now.

"We're shooting to have a standard for digitized images out by the middle of next year," said Bill Krajewski, FSTC check imaging project manager and Citibank vice president.

Krajewski pointed out that the FSTC believes any move by the banks to adopt a system of clearing imaged checks will likely have to be approved by Congress through new legislation, changes in state laws and perhaps the Uniform Commercial Code, as well as the banks' own working rules known as the Business Practices Agreement. ■

Bank members of the Financial Services Technology Consortium

Banc One Corp.	Chase Manhattan Bank	Glenview State Bank
Bank of America	Chemical Bank	Huntington Bank
Bank of Boston	Citibank	NationsBank
Barnett Bank	CoreStates	Wells Fargo
Cardinal BancShares, Inc.		

FSTC has 65 members that include banks, technology vendors, research firms and federal government agencies.

BUSINESS SPACE

The lowest common denominator

Some columns ago, I mentioned a report that my company produced about how to launch applications from a Web browser. A large number of readers took me up on the offer, and, in response, I tried to send them the report as a MIME (that stands for Multi-purpose Internet Mail Extensions) attachment to an E-mail message.

The contents of the attachment was a file in Adobe's Portable Document Format (PDF). Reading this file required a copy of Adobe's reader software and — this is the crucial point — the ability for the recipient's E-mail system to understand the MIME format.

Mark Gibbs

Out of almost 200 recipients, at least 60% wrote saying they couldn't read the attachment. This was staggering!

The reason it was staggering was that no one should have had a problem. To begin with, I had assumed that all of my faithful readers could get a copy of the Adobe reader (available on the 'Net at www.adobe.com and on all the major on-line services). This was the easy part.

I guess the hard part was standards. Their inability to read the report must have been because their E-mail systems weren't MIME-compliant. This is remarkable, as it shows (admittedly, through a rather unscientific sampling — but what is a standard deviation among friends?) that a large number of people can't use what has supposedly become a standard of Internet messaging.

So let's not fool ourselves. Here we are on the edge of the brave new world of electronic commerce, and a seriously significant number of us can't talk to one another except at the most basic level through the most basic of channels — electronic mail.

Actually, why I should be the least bit surprised by this is, in itself, a mystery. After all, a colleague sends me attachments on a regular basis that I can receive but not read (he uses Word for Windows 6, and I'm using Version 2 on the machine that I receive my E-mail on).

As if that weren't bad enough, just try and exchange real data, such as names and addresses, with someone else — or even with yourself (please note that exchanging data with yourself is OK if you are a consenting adult, regardless of what Sens. Dole and Exon say).

If it sounds like I have an ax to grind over this issue of data exchange it's because I have spent far too much time trying out various Personal Information Managers (PIM). Trying to move my data from Lotus' Organizer to anything else has proved to be a nightmare. (Actually, to digress for a second, I have just migrated to Ecco from Bellevue, Wash.-based NetManage — this may be the best PIM yet.)

As another digression, I should mention Pato Alto, Calif.-based Lexicus' Longhand, the handwriting recognizer for Windows that I referred to several columns ago...it is outstanding! This product, in my so-far limited tests, astounded me.

Anyway, what is my point? Simply that if we are to bootstrap the 'Net into the commercial world, we should at least be able to talk through E-mail.

Perhaps it is too much to expect much more than the lowest common denominator of simple text messages. But if we can't agree on reasonable standards for E-mail, we might as well give up now.

Footnote: If you were one of those who couldn't get my report, try http://silcom.com/~mgibbs/gacrep42.htm.

Gibbs is a writer and consultant based in Ventura, Calif. He is back from holiday and has grown the beard back. Send him your recommendations for a razor to mgibbs@gibbs.com or (800) 622-1108, Ext. 504.

Will your network grow into a majestic oak, or raging crabgrass?

"...LAN Server 4.0 sports a modern, graphical interface that meets the expectations of the Windows™ generation of users."
– PC Magazine
May 30, 1995

"Departmental NOS of the Year- LAN Server 4.0 Entry."
– LAN Magazine
April 1995

Award-winning LAN Server 4.0

It all depends on your software. IBM® LAN Server 4.0 will actually make your network so manageable you actually look forward to dealing with it.

How did we transform a task that at best was considered a chore? For a start, we made LAN Server 4.0 much easier to install than other network operating systems. And its powerful new drag-and-drop administration makes adding new users a walk in the park.

For more information on how the new LAN Server 4.0 can help your network grow big and strong, call your local reseller or 1 800 IBM-3333, ext. GA051. In Canada, call 1 800 565-SW4U, ext. 807.

If you would like us to fax you more information about LAN Server 4.0 directly, call 800 IBM-4FAX and request documents 1834 & 1835. Product information and demonstrations are available on the Internet at www.austin.ibm.com/pspinfo. IBM and OS/2 are registered trademarks of International Business Machines Corporation. Windows is a trademark of Microsoft Corporation. © 1995 IBM Corp. All rights reserved.

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NETWORK HELP DESK

Network World *tracks down answers to your questions. Please submit them to Dana Thorat via phone at (800) 622-1108, via the Internet at djt@world.std.com or via fax at (508) 820-1103.*

What can we do to solve problems with screen displays, programmable function keys and maintaining a host connection when we use Wall Data, Inc's Rumba for the mainframe 4.0 for terminal emulation and file transfers with our mainframe?

Gupchand Badri, Branchbury, N.J.

We checked with Wall Data and found it was a case of a missing keyboard driver. Wall Data promptly shipped Badri a diskette, and he reports that since the upgrade, he has had no problems.

Where on the Internet can I download the driver for IBM's PCMCIA II Ethernet card, and will it provide access to a LAN that uses Microsoft Corp. networking software?

Jerry Sadofsky, Omaha, Neb.

You'll find your PCMCIA driver on IBM's FTP server, says Howard Bleiwas, a staff consultant for EJR Computer Associates, Inc., a consulting firm in Hoboken, N.J. Use FTP to access ftp.pcco.ibm.com. The file, called etcc.zip, is located in the /pub/network directory.

Related drivers and support files are available on the World-Wide Web at http://www.pc.ibm.com/files.html.

This and other network boards that comply with Microsoft's Network Driver Interface Specification (NDIS) will provide access to LANs running Microsoft's or another vendor's network operating system.

Do you have information on a products called Time Machine?

Mark Anderson, via the Internet

Time Machine products are hardware-based data compressors manufactured by FastComm Communications Corp. They compress high-speed synchronous datastreams from routers and front-end processors at up to 6M bit/sec into a single T-1 or E-1 line.

For more information about available models, call FastComm at (800) 521-2496 or (703) 318-7750, send E-mail to info@fastcomm.com or visit their Web page at http://www.fastcomm.com/.

Readying nets for multipoint conferences

By Robert Castle

Since 1990, when the International Telecommunication Union (ITU) ratified the H.320 standards suite, videoconferencing has been gaining appeal as an alternative to traveling for face-to-face meetings.

The H.320 standards, which define how video and audio signals are transmitted and interpreted by videoconferencing equipment, eliminated most of the variations in video chips and circuitry once required by videoconferencing equipment manufacturers. This simplified the production of these components, which in turn decreased overall manufacturing costs.

The savings quickly found their way to corporate users: Since early 1994, a desktop conferencing subsystem — comprising a camera, microphone, video board and software — has dropped in price from $6,000 per seat to less than $2,500 per seat.

While prices are dropping, technological innovations allow videoconferencing applications to be condensed on a single board. For the first time, videoconferencing is seen as an application for the ubiquitous PC.

As high-quality videoconferencing becomes more affordable and accessible, greater demand is fostered. What will this mean for the corporate network infrastructure?

A new class of video gear

In its early stages, videoconferencing was capable of connecting only two locations, but cost reductions are leading to the deployment of more conferencing end points and a desire by customers to connect multiple locations in the same conference.

In the late 1980s, videoconferencing equipment suppliers introduced proprietary multipoint control units (MCU) to transfer video and audio signals between all conference participants, allowing everyone to see and hear all participants.

Today, standards-based MCUs can support multipoint videoconferences using equipment from different vendors.

Each location in a multipoint conference must be connected to the MCU via a wide-area leased or switched digital circuit operating at 128K bit/sec or higher. T-1 or fractional T-1 is used for leased connections, while ISDN or switched 56K bit/sec service is used for switched connections.

When switched services are used, the MCU will accept incoming calls or dial out to conference sites.

The right mix

During a conference, the MCU receives compressed audio and video from each conference site. Unlike a router, which would simply redirect the signals, the MCU decompresses audio from each site, then mixes, recompresses and sends it to each site so that each participant can hear the whole discussion.

The received video is switched so that each participant can see any other participant. Video also can be processed, using special hardware for continuous presence, so that each conference participant can see several other conference participants simultaneously.

MCUs provide interoperability among not only desktop and room-based videoconferencing systems, but also among data-conferencing computers, audiographics systems and regular telephones in the same conference. They also connect end points to other types of networks.

LAN impact

Many companies want to use their existing Ethernet or token-ring LAN infrastructure to connect desktop terminals for conferencing purposes. Video can be successfully moved over LANs. However, it is not as easy to transport audio and video together across the network with almost no real-time delay.

This latency requirement is inconsistent with the shared media concept of most LANs. Sudden spikes in LAN traffic from other applications force the videoconferencing information to wait its turn for network time. This interrupts the natural flow of speech and motion in videoconferences.

To correct this problem, the ITU's Personal Conferencing Workgroup is working to modify LAN protocols in order to reserve dedicated portions of bandwidth for videoconferencing. Individual vendors also are trying to optimize compression algorithms and communications protocols to minimize the amount of bandwidth needed over the LAN.

These efforts will modify existing LAN architectures. For example, the number of users per LAN segment may need to decrease.

The videoconferencing market is currently characterized by rapidly changing technology, evolving industry standards, emerging network architectures, as well as frequent product introductions.

So what can network managers do right now to plan for conferencing applications? They can:

- Anticipate growing user demand. Influence users' purchase decisions with overall guidelines based on standards.
- Demand full implementation of the H.320 standard. Not all new products fully comply with H.320, making interoperability among different vendors' products difficult.
- Take advantage of competition. Expect growing levels of competition between telephone carriers for videoconferencing traffic.

Competition among videoconferencing equipment vendors may intensify, which would push prices even lower.

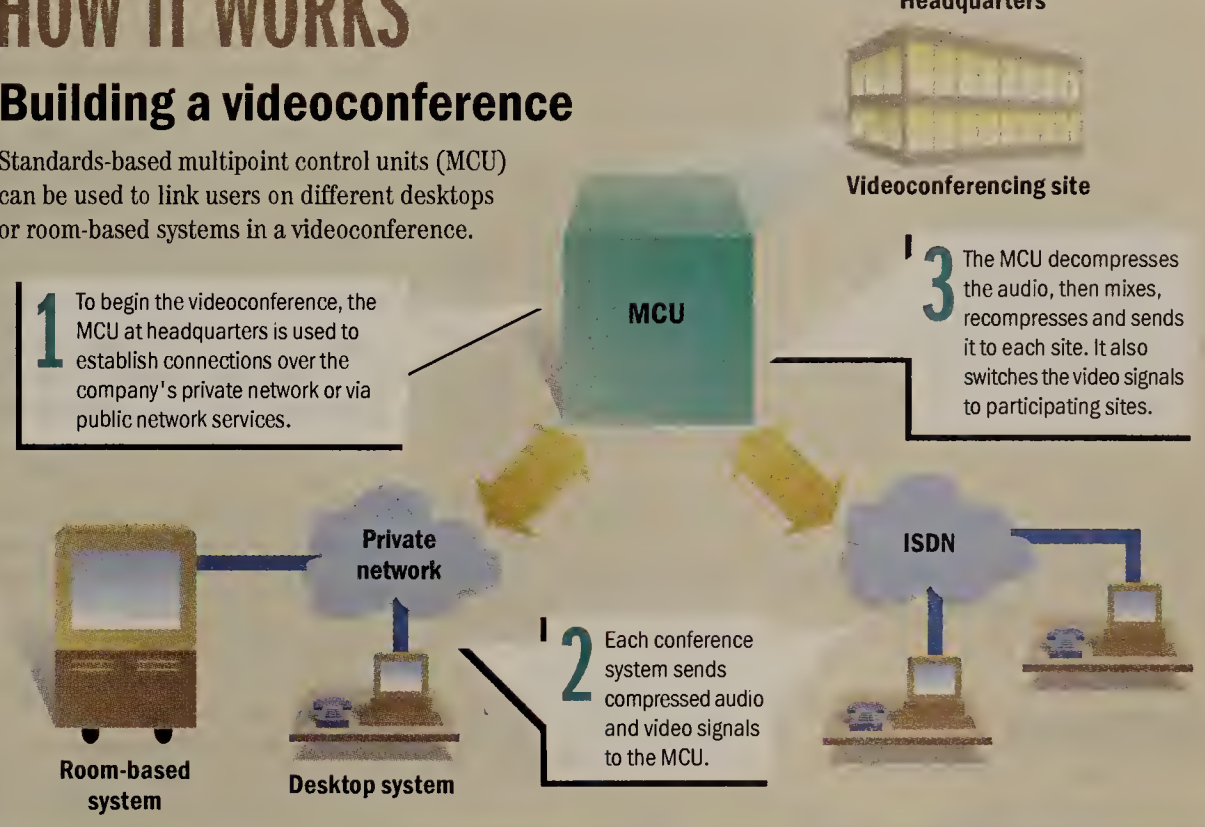
- Plan for growth. Develop a plan for an enterprisewide conferencing network. Recognize that a critical mass of participants will make this technology truly useful.

Castle is president and chief executive officer of VideoServer, Inc. in Lexington, Mass.

HOW IT WORKS

Building a videoconference

Standards-based multipoint control units (MCU) can be used to link users on different desktops or room-based systems in a videoconference.



EDITORIAL INSIGHTS

Make your mark

The biggest revelation I took away from the *Network World* roundtable on electronic commerce, chronicled in our page 1 story, was the need for companies to come up with a coherent strategy in this area.

There's at least a couple ways to look at this.

One is that electronic commerce is just another task being heaped on your already full plate. Some marketing honcho keeps hearing about the Web, wants to get in on the action and expects you to make it happen. Great. Now you're a Webmaster, or have to hire one.

But another is to consider it an opportunity. The Internet and various on-line services are making it easy to reach customers and for customers to reach you. And this on-line business is only going to get bigger.

How many millions of people will instantly be able to access The Microsoft Network once they crank up Windows 95? Whatever estimate you believe — and legal and ethical questions aside — it's a ton.

As participants in our roundtable were quick to point out, that's only one aspect of electronic commerce. Probably far more business is being done with older technologies such as EDI and voice response units.

So the question is, how do you make sense of all the available options and take full advantage of them? That's where it appears there's lots of work to be done and, for those willing to take on the challenge, careers to be made.

This is one of those areas where network IS execs can make a tangible contribution toward attaining corporate goals. You understand what's feasible from a technological perspective and are in prime position to drive the process.

Maybe it means taking the initiative to form a task force made up of your peers from other departments. Brigham and Women's Hospital in Boston, for example, has a group looking at how best to communicate electronically with various insurance companies. That's a good start.

It could mean trying to pull together corporate electronic commerce efforts already under way to better pool resources. That's especially important for companies with a decentralized structure, where it's easy for individual business units to wind up duplicating efforts.

Whatever your particular case may be, opportunity is knocking loudly here.

Let it in before your competitors do.

Paul Desmond, Features Editor pdesmond@nww.com

Teletoons

By Phil Frank and Joe Troise
guru@well.com

THE BLUE VIEW

Chipcom's acquisition may point to a new focus for IBM

Anura Guruge

What does the much-hyped acquisition of Chipcom Corp. by 3Com Corp. mean for IBM? Although the deal poses some stiff challenges in the short- to mid-term, it ultimately may mean that IBM will focus on a few core networking technologies.

The acquisition, especially because it involved 3Com, was a blow to IBM in a number of ways. Because of the deal, IBM is now in a unique and intriguing situation: beholden to its two largest networking competitors, Cisco Systems, Inc. and 3Com, for nearly all of its strategic, campus-oriented products.

Moreover, 3Com is now IBM's only competitor in the LAN arena that can match the blue giant, item for item, from LAN adapters to a multiprotocol bridge/router so similar to the 6611 that it even has Advanced Peer-to-Peer Networking Network Node routing.

The Chipcom merger bolsters 3Com's already extensive hub offerings and is likely to fuel 3Com's aggressive foray into Ethernet switching — a thriving market that IBM is just preparing to enter.

Users must evaluate the Chipcom acquisition alongside Cisco snatching Kalpana, Inc. away from IBM last fall. Perhaps as a direct result, IBM, the doyen of token-ring LANs, still does not have a token-ring LAN switch on the market — even though Bay Networks, Inc., Nashoba Networks, Inc., Standard Microsystems Corp. and Cisco all have products shipping.

And even when IBM's switch becomes available in late September, it won't have source-route bridging — a standard feature on competing switches.

IBM compensated for the loss of Kalpana by forging a joint, reciprocal marketing agreement with Cisco for LAN switching products that include Kalpana technology.

As a result, IBM got access to Kalpana technology and products; and Cisco, possibly tongue-in-cheek, agreed to resell IBM LAN switches — even though with its acquisition of Kalpana, Crescendo Communications, Inc. and Lightstream, Inc., Cisco now holds a mighty strong suite of switching technology stalwarts.

The notion of such a joint agreement between IBM and Cisco is hard to fathom. There is little love lost between them, with Cisco so blatantly committed and impressively equipped for winning over IBM's Systems Network Architecture/APPN customer base. But given IBM's desire to maintain access to Kalpana, it really didn't have much choice but to cut a deal with Cisco.

The joint loss of Chipcom and Kalpana appears to have cast a shadow over IBM's future fortunes in the campus arena — particularly from an Asynchronous Transfer Mode standpoint. But this position may be consistent with where IBM wants to be five years from now.

To date, IBM has three campus products with ATM capability: the 8260 jointly developed with Chipcom, and the 8271 and 8272 LAN switches developed with the help of Kalpana.

IBM in June announced a "best-of-breed" stackable token-ring hub — a topical and very hot item in today's token-ring market — the IBM 8238. But guess what? The 8238 was also a joint development between IBM and Chipcom.

It is the ATM implications that continue to highlight IBM's apparent failure to hold on to Kalpana and Chipcom. ATM, IBM repeatedly tells us, is the foundation of its future networking initiatives. But it then lets Kalpana and Chipcom slip from its grasp, which is hard to rationalize given IBM had ample opportunity and motive to buy Chipcom itself.

IBM, even after its purchase of Lotus Development Corp., still had more than enough money to buy Chipcom as well as Bay Networks, a course I suggested at the time.

IBM obviously was more than happy to spend nearly $4 billion acquiring Lotus, when Chipcom was up for grabs earlier this summer for one-eighth of that. This, I think, finally clues us in to the thinking of IBM's senior management.

The joint loss of Chipcom and Kalpana appears to cast a shadow over IBM's future fortunes in the campus arena — particularly from an ATM standpoint.

IBM probably viewed Chipcom and Kalpana, despite their ATM connection, as providing technology for products that in time will become commodity items.

If this is not at least partially true, to have let Chipcom get away after already losing out on Kalpana smacks of carelessness — a trait not normally associated with IBM.

It's likely IBM no longer wants to bother with such products — correctly recognizing that it is unlikely to have total control over large networks.

Not only are there strong competitors — such as Cisco and 3Com — but there is also the shift toward the use of public frame relay and ATM networks.

Instead, it appears that IBM would prefer to concentrate on two areas: large ATM switches that it can try to sell to public network providers; and middleware services, such as Lotus Notes, that would run on top of any network.

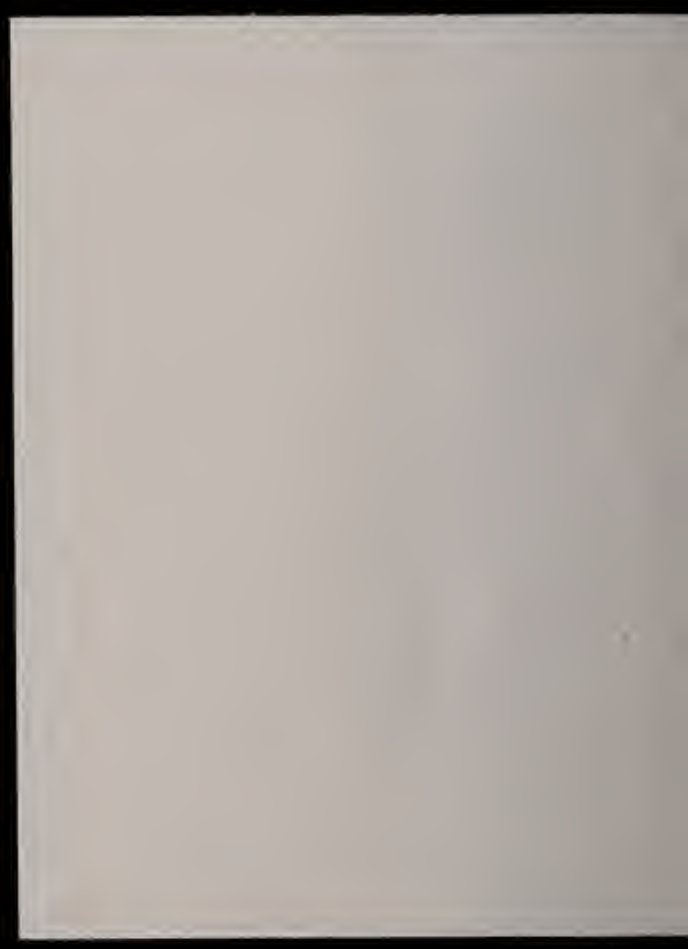
If this is indeed the case, it signals a change in IBM's role over the last 30-odd years as a full-spectrum networking vendor.

Over the next few years, I think IBM will become more selective in what it actively pursues in the overall networking arena.

Rather than trying to be all things to all people, IBM could set out to excel in a few designated fields — high-end ATM, middleware, networking applications (that's why it did bother to acquire Lotus and its cc:Mail) and systems management.

In this light, the Chipcom deal is a blessing in disguise. It forces IBM to start concentrating on the technologies that it considers important.

Guruge is an independent consultant specializing in internetworking and IBM network architectures. He can be reached at (603) 878-1303 or via the Internet at aguruge@mcimail.com.



USER FORUM

A tale of credibility, vendor claims and a crystal ball

Martin Zinaich

There comes a time in every network manager's life when he has to put his credibility on the line. My time came when I recommended an E-mail package that, I thought, would keep my organization from being buried by the ever-increasing task of maintaining E-mail lists.

The product was fast, small and affordable, but best of all, it had a special feature called Name Services. This feature was supposed to allow me to add a user to my Novell server, then sit back, have a cup of coffee and watch while the user's name made its way over our token-ring backbone, 56K bit/sec data links and 9.2K bit/sec dial-up lines to our remote sites. After about an hour, the E-mail lists at all sites would be in sync.

The vendor's energetic salesman answered every question I had and listened to every concern. He asked me to show him one thing that another product could do that his didn't do better.

Not being one to let someone think they're perfect, I started searching for a flaw. I found one: The product wasn't able to pull the Novell user name into the E-mail list in reverse order (last name first), which meant I'd have to reenter every user's name. The vendor responded by offering to provide us with an update patch that would correct the problem.

In fact, he said they'd even throw in a free upgrade to Version 2.0 of the product. Since Version 2.0's release was only weeks away, we decided to postpone further installation and hit the ground running with the new version.

A month later, the product boxes arrived at our warehouse. Our first enterprise application was about to come to fruition. I couldn't wait to set the Name Service part, but to my surprise, I couldn't find it listed in any of the product documentation.

A quick call to the free technical support revealed that Name Services was no longer a single feature. It was now two features: one still called Name Services, which would keep Novell's Message Handling Service up-to-date; and another called Address Book Sync (ABS) that would keep the E-mail lists in sync. ABS was scheduled to be available in the next maintenance release, Version 2.2.

Months later, we upgraded all the servers to Version 2.2 and installed ABS. It ran but was much slower than the single Name Services feature had been.

Many calls to the vendor's now $2,500-per-year technical support service revealed major problems.

"Nothing that can't be fixed," the vendor said. "Just buy an upgrade to Version 2.5." I watched as my credibility with upper management melted like an ice cube in a frying pan. I offered up the "we're already in this deep" rationale.

We suffered through another upgrade, with no improvement. End users were rapidly losing confidence, and my credibility continued to evaporate.

Still, all was not lost. If we would just upgrade to the soon-to-be-released Version 3.0, the vendor assured us, our problems would be solved. By this time, my credibility had turned into vapor somewhere over Tampa.

We spent more time and money trying to make the product work. The vendor sent patches; we tried tests. We pointed out major flaws; the vendor said our situation was unique.

I found myself engaged in a contest of verbal judo. "If a server is down when ABS runs, ABS thinks it updated the server anyway, and we never know users are missing from that server's list," I explained. "Well, we do expect a server and all associated links to be up whenever ABS runs," the vendor countered. Meanwhile, at this point a complete cycle of ABS was taking longer than 186 hours.

Finally, the vendor admitted this ABS product would not work. They suggested we never run it again and that we use the old standby sneakernet to manually move files between servers.

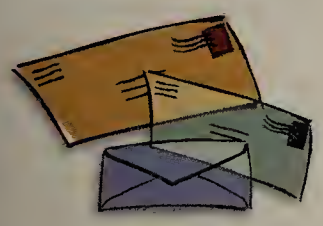
What had happened to the get-it-done company that had won me over? Where did it all fall apart? I'm sure the inside story would make an interesting study.

This vendor was probably a victim of the same old company-grew-too-fast, maximized-profits-at-all-cost approach that has caused so many American companies to fail.

The lesson in all this is simple: Picking a network product in today's market is very much like gazing into a crystal ball and hoping your analysis proves accurate.

If there is any justice, vendors that abuse users' faith in them and fail to deliver on promises will eventually disappear, never to be seen in a crystal ball again.

Zinaich is a senior applications programmer/analyst for the city of Tampa. He can be reached via the Internet at martin@cftnet.com.



IN-BOX

Not a Windows 95 fan

What would you do if...

...your new car broke down on the way out of the lot and the salesman told you, "Still a few minor problems with the engine. You need to spend another $2,000 to get the problems fixed."

...you leave the dentist office with a new crown, it falls out on the way home and the dentist says, "The new adhesive still has a few problems. You need to spend another $600 to get it fixed."

...your new boat sinks the first time on the water and the dealer says, "That new plug doesn't quite fit. You need to spend another $800 to get it fixed."

Sound far-fetched? Not in the software world. Software companies have been bleeding their customers at phenomenal rates for years just because they would rather get their product on the market than spend a few more months in R&D. Free bug fixes? Not anymore. Free support? I don't think so.

Microsoft is showing its colors well this year in the field of "rush-to-market" technology.

Will Windows 95 work? I doubt it will. Is it 100% backward-compatible? Nope, not even close. Will I buy Windows 95? I don't think so.

Alan Warren
Data processing manager
Weatherford College
Weatherford, Texas

How to reach us

CALL: (508) 875-6400
FAX: (508) 820-3467
WRITE: *Network World,* 161 Worcester Road, Framingham, Mass. 01701
INTERNET: network@world.std.com
MCIMAIL: 390-4868
NETWORK HELP DESK: Contact Dana Thorat by any of the means above or via the Internet at djt@world. std.com
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Feature

ATM CARRIER INFRASTRUCTURES

Part Three

Extracting a price for NETWORK CONTROL

ATM puts you in charge, but only if you do your homework

By Beth Gage

ATM has been designed to give you complete network control, enabling you to match the characteristics of a connection to the application it is supporting. But this fine-tuning capability comes at a steep price in terms of complexity.

Bear with us here, because the propensity of our industry to condense terms into three-letter acronyms reaches a whole new level when it comes to ATM, or Asynchronous Transfer Mode, technology. Yet it's important to understand the definitions and intended uses of various types of service when making decisions about how to set up your network.

First, there's a host of ATM classes of service, one of which must be defined for each connection. You are probably familiar with the basic classes — constant bit rate (CBR), variable bit rate (VBR), available bit rate (ABR) and unspecified bit rate (UBR).

For each connection, you also have to assign values to several traffic descriptors, such as peak cell rate (PCR), sustained cell rate (SCR) and minimum cell rate (MCR).

Then there's qualities of service (QoS) to deal with. Although often used interchangeably with class of service, the two terms describe different things. QoS refers to parameters such as cell-transfer delay, cell delay variation tolerance, cell loss ratio and cell error ratio. Class of service refers to the type of connection that the application requires. For example, if you are transporting compressed audio between two locations, you might define a connection with VBR class of service and QoS parameters, such as a specific cell loss ratio, to meet performance requirements.

Even though ATM is a "standard," not all vendors and service providers use these ATM terms consistently. Additionally, the carriers do not currently support all the classes discussed in this article, as some are still being defined by the ATM Forum.

First class, business or coach?

ATM definitions for classes of service bear a faint resemblance to those in place a year ago.

To the credit of the ATM Forum, the current definitions are much more specific than previous versions. The problem is you cannot accurately judge the class of service to use simply by the name itself.

QoS is another matter. When you ask various vendors and carriers about the difference between ATM classes of service and QoS, answers can range from "no difference at all" to a lengthy discourse on each QoS parameter. There is little consistency.

Here's the straight skinny: There are currently five basic classes of ATM service. Table 1 (page 42) outlines the current classes of service, the traffic descriptors that must be assigned and some applications that might use each class.

CBR is designed for traffic that must maintain an end-to-end timing relationship between the source and destination. You could use CBR virtual connections to tie together your private branch exchanges across a WAN, for example.

CBR will also form the basis for circuit emulation. Circuit emulation means that you can enter and exit an ATM network using a standard, legacy T-1 interface, while the network just happens to be running cell relay. However, CBR does not automatically mean circuit emulation, although some mistakenly use the terms interchangeably.

Real-time VBR (VBR-RT) also requires maintenance of an end-to-end timing relationship, although it is not as stringent as CBR in terms of cell delay, delay variation and cell loss requirements. VBR-RT class of service should be used for real-time video applications, such as room videoconferencing and live TV broadcasts.

Non-real time VBR (VBR-NRT) specifies a data transfer that does not require an end-to-end timing relationship. The QoS parameters for this class can tolerate high delays and delay variation. Applications include video playback such as video-on-demand and store-and-forward TV.

VBR-NRT is also being considered for transporting other data services, such as frame relay, over ATM. But VBR does not allow for a sustained burst, which presents a problem because cells could be dropped. The traffic characteristics of the aggregated frame relay traffic would have to be well known to define the VBR-NRT traffic parameters correctly.

ABR, the fourth class of service, requires end-to-end flow control, which may limit it to applications that run native ATM. It might be possible to deliver frame relay over ABR if the flow-control requirements are loosened.

ABR services have yet to be defined by the ATM Forum, although the definition is expected to be approved by the end of this year. As of now, ABR connections require continuous feedback between the source (that is, customer premises equipment) and the network, and may, therefore, be expensive for CPE vendors to implement.

UBR services are also known as best-effort services. Basically, service is offered to UBR connections only when there is excess network capacity. UBR is meant for applications such as delivering TCP/IP traffic and client/server networking, where upper layer protocols will detect errors and retransmit data. One of the advantages of UBR is that it is perceived to be very inexpensive to implement on the vendor side.

An early implementation of UBR and ABR service will probably have customers sending traffic to the network over UBR connections and across the network over ABR connections. This would provide minimum throughput across the network but would not require costly upgrades to support ABR at the customer premise. It would be ideal for frame relay-like services over ATM and for many LAN applications because there would be virtually no speed limits, whereas frame relay is generally limited to 1.5M bit/sec.

Delivering classes of service

The trouble with having all these classes of service is that a single switching system must treat each class differently while handling all services simultaneously

Continued on page 42

Third of a five-part series. *For a look at Part 2, which ran Aug. 14, point your Web browser at http://www.nww.com/atm2.html. Links are provided from there to Part 1.*

When the U.S. Geological Survey went looking for broader connectivity in a network operating system (NOS), they discovered NetWare 4.1.

For most networks, the need to support a wide assortment of client platforms and protocols is a fact of life. For Evan Trebing, U.S. Geological Survey computer specialist, so is the need for the NetWare® 4.1 NOS.

U.S. Geological Survey had on discovered NetWare 4.1's built-in mu

NetWare 4.1 comes with everything you need to run your network on TCP/IP, allowing you a choice of IPX or TCP/IP protocols. It also provides built-in Macintosh support. Add this to existing multiplatform support for DOS, MS Windows, OS/2 and UNIX clients and you'll find that NetWare 4.1 is the richest cross-platform environment around.

With NetWare 4.1, multiprotocol routing even comes built-in. This means you get the advantages of cross-protocol routing capabilities while saving the costs of additional hardware.

But the savings don't stop there. According to

Mr. Trebing, "NetWare Directory Services™ (NDS™) is completely revolutionizing our network." Because this unique graphical user interface lets you view and update your network as a single entity, NDS helps you to reduce training time, increase productivity and

thought when they rotocol support: Paydirt.

reduce your cost of ownership.

All of which helps to prove that there's simply no other network on earth like NetWare 4.1.

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Continued from page 39

at very high speeds. Multiple classes of service bring challenges in providing highly reliable service for each connection in a net, especially while the network is in a constant state of flux.

This is hard enough to accomplish with permanent virtual circuits (PVC), but it will become extremely difficult once switched virtual ciruits (SVC) arrive.

When ATM PVCs or SVCs are provisioned, the Call Admission Control procedures in the ATM network take each request for connection and determine whether network resources are available. For PVCs, this happens once. For SVCs, this negotiation happens in real time with each and every call.

critical data traffic, while the other would be for imaging applications. However, until providers gain expertise on a per-application basis, we are not likely to see many application-specific service definitions.

Table 2 details how the different platforms handle class-of-service delivery.

Service availability update

Service providers are hoping they will be able to help you translate your application and traffic requirements into a service class and set of QoS parameters. Until more information about the performance of different applications over an ATM public network is gathered, it is difficult to know how to translate bit-per-second values into cells per second, where to set delay variation and variation tolerance, what to set as the ideal value of the maximum burst size, and so on.

Pick your class

Table 1

Class of service	Old class of service name	Traffic descriptors	Applications
CBR	Class A	PCR	Circuit emulation, voice over ATM
VBR-RT	Class B	PCR, SCR, MBS	Live video transmission, SNA applications over ATM, audio signals in teleconferencing, compressed voice
VBR-NRT	Class B	PCR, SCR, MBS	Video playback, mission-critical data applications, video teleconferencing, multimedia applications
ABR	Class C	PCR, MCR	Native ATM data applications, frame relay over ATM
UBR	Class D	None	IP over ATM, SMDS over ATM

MBS = Maximum burst size PCR = Peak cell rate
MCR = Minimum cell rate SCR = Sustained cell rate

Since CBR connections have the most stringent requirements in timing and delay, they are always given highest priority within a switch. UBR connections, which have no guarantees, are the lowest priority.

If you caught the last installment of this series (*NW*, Aug. 14, page 35), you might remember that the architecture of each vendor's switch platform is unique. Each vendor has a different approach to buffering and traffic management, and how each class of service is handled.

Platform technology update

Second-generation ATM switches support a minimum of two classes of service — CBR and VBR — and most support more. While standards have not been finalized for ABR services, a few vendors offer proprietary versions today. Some offer UBR support, with plans to implement ABR when standards are final.

Many second-generation switches offer the flexibility to define QoS parameters for each class of service, which helps service providers define "subclasses" of service. For example, a carrier could define two VBR-NRT classes by differentiating the cell loss ratio between the two classes. One class could be used for high-priority, mission-

For the most part, service providers offer only CBR and VBR classes of service today; we assume the VBR connections are for non-real-time applications although the providers do not specify.

If you opt for CBR connections, you will likely pay through the nose. Carriers are keeping prices high because they are afraid of cannibalization of the installed base of private-line and virtual voice services.

VBR services are available from all the ATM service providers, but WorldCom, Inc. and MFS Datanet, Inc. are the first to go the extra step of translating this underlying technology into service packages.

ATM VBR connections form the basis of WorldCom's ATM LAN Interconnection Services.

MFS Datanet uses ATM for the backbone of its Frame Transport Service as well as its Integrated Voice and Data Service. By packaging services that mask the underlying technology, you are saved from learning the intricacies of ATM.

You may also be saved from justifying capital budgets for new ATM equipment since, in many cases, existing CPE can be used.

These services should help you realize more efficient bandwidth utilization, more economies of scale and lower costs when compared to similar private-line configurations.

AT&T is the only service provider that offers ABR-like connections (albeit on an individual-case basis), thanks to ReliaBURST, a rate-based algorithm implemented on the AT&T GlobeView-2000 switch. (ReliaBURST is not an option available to other service providers that use GlobeView-2000.)

AT&T has also recently deployed StrataCom, Inc.'s BPX switch, which supports ABR and UBR classes of service in addition to CBR and VBR. AT&T expects to implement ABR and UBR services once standards are finalized. Beware of AT&T's CBR service pricing — it is mileage-based and priced at a premium.

MCI Communications Corp. is the only carrier offering UBR class of service today. MCI also offers CBR and VBR-NRT service, with CBR priced at a premium. UBR, CBR and VBR-NRT connections are offered at fixed rates based on customer-definable components such as port speed, service class and traffic descriptors.

Sprint Corp. offers only CBR and VBR classes of service. However, Sprint offers usage-based billing for VBR connections, which can be 15% to 40% less expensive than fixed-rate VBR connections.

Three local exchange carriers — Pacific Bell, US WEST, Inc. and GTE Telephone Operations — have announced ATM services and have tariffs in various stages of regulatory approval. They structure ATM service pricing much differently than the long-distance carriers do.

For example, US WEST charges less for CBR than for VBR because the carrier effectively overprovisions VBR connections in order to deliver the momentary burst capability. Pacific Bell's commercial offering will require you to define an Information Access Rate, which is somewhat analogous to a committed information rate.

GTE is unique among the local carriers in that it has a national presence. GTE provides ATM service in Tampa, Fla., Lexington, Ky., Durham/Research Triangle Park, N.C., Dallas, Los Angeles, Portland, Ore., and Seattle. GTE uses a tiered rate structure based on bandwidth, where customers are charged the same base amount for bandwidth VBR as with CBR. However, with VBR, additional charges are incurred for each megabit of traffic that bursts above the defined average.

For the interexchange carriers, monthly recurring costs for DS-3 ATM service range from $20,000 to more than $40,000, depending on the class of service, the number of connections and their speed. Virtual circuits on a 45M bit/sec line range from 1.5M bit/sec, or less with some carriers, to 34M bit/sec. DS-3 ATM may be very difficult to cost-justify, thus making T-1 ATM that much more important.

For the local carriers, pricing can be fairly aggressive. US WEST prices a T-3 ATM port at $1,150 per month, while an OC-3 connection is $1,500. A VBR connection is $37.50 per month per megabit, which can add up but still raises the possibility of rapid adoption in US WEST territory.

CHANGING CLASSES

Adding to the challenge of delivering multiple classes of service is the fact that the standards are constantly changing. Since 1994, the classes of service have gone from A, B, C and D to CBR, VBR-CO (connection oriented) and VBR-CLS (connectionless) to the current set of CBR, VBR-RT, VBR-NRT, ABR and UBR.

Complexity vs. control

It will be difficult to define the many parameters offered by ATM without a clear understanding of traffic patterns and application requirements. Until service providers take the next step and define user-friendly services that do not require you to understand the finer points of ATM technology, you will face a steep learning curve in understanding how to make ATM work for you.

This problem is compounded by the constant maturation of ATM Forum definitions. The end of this year should bring closure to many outstanding issues, at least until real-world experiences force another rewrite.

The relative immaturity of ATM services and standards should prompt you to ask service providers tough questions about how your network will be designed and service delivered.

The good news is that most equipment and service providers are willing to work closely with ATM customers to help optimize performance.

Next month, we'll take a look at some of the network management tools that vendors offer to help with network traffic analysis and design.

The crystal balls are on their way, but will it be too little, too late?

Gage is a consultant at TeleChoice, Inc., specializing in ATM and other broadband services and equipment. She can be reached at (201) 239-0700 or at bgage@telechoice.com.

The ATM players and service classes supported

Table 2

Vendor	Platform	Classes supported	Characteristics
Alcatel Data Networks	1100 HSS	CBR, VBR-RT, VBR-NRT, UBR	Connections are prioritized by class of service and handled by RateMaster congestion avoidance algorithm according to priority of the class
AT&T Network Systems	GlobeView 2000	CBR, VBR-RT, VBR-NRT, ABR	CBR cells given priority over VBR on egress transmission
Cascade	Cascade 500	CBR, VBR-RT, VBR-NRT, ABR, UBR	Each class of service has its own switching fabric and buffers
General DataComm	APEX NPX	CBR, VBR-NRT, UBR	Separate buffers for each class of service
Newbridge Networks	MainStreet 36170	CBR, VBR-RT, VBR-NRT, ABR, UBR	Dynamically allocable buffers per class of service and separate queues for each class of service
NorTel	Magellan Concorde	CBR, VBR-NRT	Dynamically allocable buffers per class of service
NorTel	Magellan Vector	CBR, VBR-RT, VBR-NRT, ABR, UBR	Dynamically allocable buffers per class of service
Siemens Stromberg-Carlson	EWSXpress 3100	CBR, VBR-NRT	Output buffers shared between classes of service
StrataCom	BPX	CBR, VBR-RT, VBR-NRT, ABR, UBR	Separate, configurable trunk and egress buffers for each class of service

SWITCHING enters the token ring

By Scott Haugdahl

Centillion gets a jump on the token-ring market with a switch that's ready for the enterprise.

Over the past year or so, Ethernet switches have been among the hottest selling LAN products. But so far, the token-ring market has largely been left to a single player, Centillion Networks, Inc.

The rest of the token-ring crowd have been slipping in their product delivery dates: Of four vendors that promised they would be shipping in time for testing this summer, only Centillion was able to provide us with a token-ring switch unit. Madge Networks, Inc., Nashoba Networks, Inc. and Cabletron Systems, Inc. initially agreed to provide a production switch, but all declined to send even a beta in time for testing. IBM also plans to ship a token-ring switch, perhaps as early as this month.

Once a start-up and now a division of Bay Networks, Inc., Centillion bet big on token-ring switching technology built around an Asynchronous Transfer Mode core. Centillion's main product offering, the Centillion 100 (formerly the SpeedSwitch 100), is an integrated token-ring and ATM switch with a 3.2G bit/sec internal ATM backplane.

The Centillion 100 we tested exhibited very little latency when transferring back-to-back packets from ring to ring, making it suitable for heavily loaded token-ring networks.

A token-ring switch module, TokenSpeed, switches as many as four token-ring ports independent of the ATM backplane (that is, across the module) or in conjunction with the backplane. At this time, TokenSpeed supports standard token-ring connections. Support for full-duplex operation is expected to be added once a standard is ratified.

Users may add four-port token-ring, four-port Ethernet and two-port ATM modules. Adding a two-port ATM switch module enables users to switch token-ring packets over ATM to another Centillion 100 switch. A switch chassis supports six modules for a maximum of 24 switched token-ring ports. For redundancy, the product can be configured with a second power supply.

LATENCY ACROSS THE INTERNAL BACKPLANE

Figure 1

Packet size	Latency (milliseconds)
24	48
71	94
573	223
1,028	329
2,180	700
3,968	1,186

Our configuration consisted of one switch chassis with two four-port token-ring modules. One module included the requisite management control functions, with an external serial port for managing the device via a modem or direct serial connection.

The switch supports four different bridging modes: transparent (with or without spanning tree enabled); source-routed; source-routed pass-through, which lets source-routed frames pass through the switch as if they were transparently bridged; and source-routed and transparent simultaneously. In the last method, transparent bridging is used if the packet does not have the routing information field (RIF) present.

This switch automatically senses both 16M bit/sec token rings and the older 4M bit/sec ones, and a module can support ports of different speeds. Thus, you could have a 16M bit/sec token ring connected to one port and a 4M bit/sec token ring to another.

Another useful feature of the Centillion 100 is an explorer proxy for source routing that helps to minimize the impact of broadcast frames used to find other end nodes in a source-routed network.

By learning the RIFs from prior frames, the switch remembers which end nodes are associated with which routes. When an explorer frame comes through, rather than forwarding it to all ports, the switch can limit the frame to the actual ring that will get the frame to the destination.

The switch can also cache as many as 500 NETBIOS names so that when a NETBIOS broadcast goes out to find a server based on its name, the switch can limit the frame to the correct ring.

As with the explorer proxy feature, the Centillion 100 can direct NETBIOS broadcasts to the proper destination ring without flooding every ring on the network.

Packet filters can be set with address offsets specified relative to the beginning of the frame or Logical Link Control (LLC) header. The first 255 bytes of each frame can be checked, with 128 filters maximum per port, and any filter can be applied to more than one port. A filter can be set to forward or drop packets based on header information.

One feature we welcomed is the ability to apply a filter and forward packets that pass the filter to a specific port. This allows for some interesting protocol analysis possibilities. For example, one can set an LLC Service Access Point filter to hexadecimal E0 — signifying NetWare LLC packets — in order to monitor NetWare traffic using LLC encapsulation between selected ports.

The Centillion also supports virtual networks. By allowing token-ring segments connected to different ports to share the same ring numbers, the switch simplifies management and movement of devices between segments.

Virtual networks also allow workstations to connect to servers within the same virtual network without having to issue broadcast explorer frames.

Continued on page 44

NetResults

Product
Centillion 100

Key findings
- Handles back-to-back frames with little throughput degradation.
- Suitable for high-volume workgroup switching, multiple source route bridge replacement, and collapsed backbone usage.

Vendor
Centillion Networks, Inc.
359 Ravendale Drive
Mountain View, Calif. 94043
Phone: (415) 969-6700
Fax: (415) 969-6710
E-mail: info@centillion.com
URL: www.baynetworks.com

Price as tested
$18,585

RFC
Request for Comment

The Network World Test Alliance will be looking at more token-ring and Ethernet switches in upcoming issues. Vendors and readers with suggestions for which products we should tackle should send E-mail to Test/Reviews Editor Lee Schlesinger at lschlesi@nww.com.

HOW WE DID IT

In testing token-ring switches, we wanted to build on the testing methodologies used in our Ethernet switch reviews — namely, latency measurements, a bulk file-transfer benchmark and packet loss rates when exercising multiple ports over a high rate of varying packet sizes.

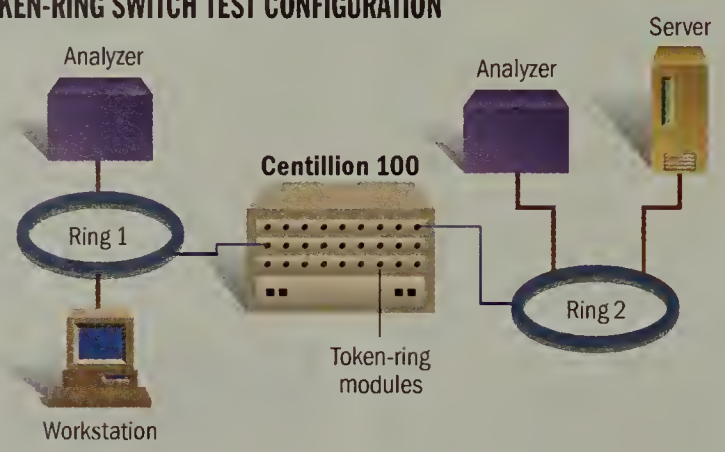
We had to write off the packet loss rate tests when we failed to find a token-ring tool functionally equivalent to Alantec Corp.'s PowerBits, an Ethernet multiport packet blaster and measurement tool. We experimented with several analyzer products to transmit and receive packets. The problem wasn't being able to generate a high enough rate of traffic over multiple ports, but being able to measure it accurately. Our analyzers, even the high-end models with hardware assist, couldn't keep up with high rates of small-packet generation, even with one analyzer transmitting and another receiving on the same ring. When testing less than maximum bandwidth, they worked fine — and putting our switch under test in between made no difference; no frames were dropped.

Latency

We were able to measure latency and expand on our file-transfer tests. We gathered latency measurements using dual Wandel & Goltermann Technology Corp. Domino analyzers. The clocks between the two Domino units are synchronized, and frames from both analyzers can be compared side-by-side in a Windows environment. (Another highly recommended tool for latency measurement is Azure Technologies' LANPharaoh, which also synchronizes multiple units and displays the results side by side in a DOS environment.)

Since the time stamp is at the end of the frame in all cases, the latency measured was calculated by subtracting the time stamp of the forwarded frame from that of the original frame and then subtracting the time the forwarded frame spent on the receiving 16M bit/sec token ring at half a microsecond per byte. This leaves us with a small contention time (to acquire the token on the forwarding ring) plus the time it took the frame to switch internally — the latency. By using very small test rings (only two nodes) on each port, we minimized the effect of token acquisition time in the tests.

TOKEN-RING SWITCH TEST CONFIGURATION



Frame sizes

Rather than simply test frames sizes of 32, 64, 128, 256, 512 and 1,024 bytes, we picked a mix of frame sizes common in actual token-ring networks. The frame sizes ranged from 24 to 3,968 bytes, including the 4-byte cyclic redundancy check. Because the Centillion 100 can switch frames directly port to port within a module independent of the ATM backplane, we tested latency within a module as well as from module to module.

Next, we conducted four file-transfer tests with and without an interleaving switch between a workstation and file server. We tried the tests with both small (1K-byte) and large (4K-byte) packets. We ran with a one-to-one ratio of request to reply frames and with packet burst.

The four tests were: small packets and one-to-one window; large packets and one-to-one window; small packets and packet burst ; and large packets and packet burst.

In all cases, we transferred a 2M-byte file from a file server to a workstation. The first two tests simulated a lightly loaded network. The second tests simulated a more heavily utilized network, in that multiple frames were received nearly back to back.

File-transfer tests

Figure 2
Tests compare file-transfer rates with and without the Centillion 100 between workstation and file server.

Test	Without switch (in seconds)	With switch (in seconds)	Difference (percentage)
Small packets, one-to-one	7.81	10.10	+29
Large packets, one-to-one	4.85	6.70	+38
Small packets, packet burst	5.64	5.78	+2
Large packets, packet burst	4.28	4.34	+1

Continued from page 43

Our latency test results indicated that switching directly across a module was only slightly faster than switching over the internal backplane between modules. We expected the latency to be better when switching within a module since, in those cases, the switch does not have to chop up the frames into 53-byte ATM cells to transfer them across the ATM backplane, then reassemble them at the other port before transmitting the complete frames to the destination ring.

Figure 1 on page 43 summarizes the switch latency between two token-ring ports across the internal backplane. Notice that the latency is not simply the receive time of a frame (which increases as the frame gets larger) from the 16M bit/sec token ring plus a fixed delta time, but rather the receive time and a variable delta that increases as the frame gets larger. This is somewhat surprising since our experience with store-and-forward Ethernet switches shows that latency has a fixed delta, regardless of frame size.

These latencies seem high at first glance, but keep in mind that these numbers are for a single workstation talking to a single server. Thus, the numbers really represent the time it takes for the first frame to be internally switched.

If there are back-to-back frames coming in a port, a switch can pipeline the data to a forwarding port so that the interframe latency inside the switch is minimized. This is the typical case on heavily loaded networks, or nodes that utilize the NetWare packet burst or TCP sliding window protocol.

In theory, heavier traffic or use of the appropriate file-transfer protocol should negate much of the effect of internal latency.

We decided to test that theory.

Our next benchmark consists of four file-transfer tests conducted with and without the Centillion switch between a workstation and file server. Figure 2 summarizes the results.

The test results indicate that the switch adds measurable delay when traffic is very light, but delay is minimal when back-to-back frames are present. Therefore, the switch is ideal for heavily loaded ring segments, which is, after all, the principal reason for implementing multiport switching technology.

Another important implementation consideration is the effect of having multiple switches, or switch hops, between a source and destination. With the Centillion 100, the added delay should be minimal because the vendor uses 155M bit/sec ATM links to interconnect switches.

If there are more than two switches between the source and destination, intermediate switches can immediately forward a cell to the next switch. So between switches, one gains a cut-through effect due to the nature of ATM.

Only the switch containing the final token-ring port must wait to receive all the cells before transmitting the frame onto the destination ring.

Under the heavy loads for which a switch is designed, the Centillion 100 exhibited very little latency transferring packets between rings.

Centillion's numbers look even better when you consider that no other vendor's token-ring switch was ready for testing. However, we expect other vendors to present some worthy competition in our next round of token-ring switch tests. ■

The alliance is a cooperative of users, consultants, educators and integrators that applies its technical and business skills to analyze and compare strategic network products. A list of alliance partners can be found on page 37.

Haugdahl is a network analysis engineer at Pine Mountain Group, Inc. He spends his time troubleshooting networks, training end users in protocol analysis, network optimization and troubleshooting techniques, and developing tools to allow users to make better use of their protocol analyzers. He can be reached at scott@pmg.com.

Technical challenges for token-ring switch vendors

Token-ring switching presents some interesting technical challenges not present with Ethernet.

One promise of switches is to remove some of the latency associated with bridges and routers. A problem with token ring is that a sender must wait for a free token before sending the frame.

Once the frame is received, the switch must determine the forwarding port based on the destination address at the beginning of the frame (following the frame control and access control fields), then wait for a token on the destination ring. Thus, the token-passing mechanism adds latency.

The worst case scenario is a single station sending data from the source ring, because it must wait for a token for every frame, even though no other stations are contending for the token. Now imagine this in a network with a hierarchy or cascade of switches in a pure token-ring setting.

Token latency can add up, in a way similar to the effect of bridging in today's token-ring environments.

Several approaches to implementing token-ring switches help alleviate the effect of latency. These include cut-through operation, full-duplex operation or using a technology other than token ring to connect switches in a hierarchical (tiered) or cascaded network.

CUT-THROUGH VS. STORE AND FORWARD

The approach by vendors such as IBM and Madge Networks, Inc. i to minimize latency by operating the switch as close to cut-through as possible.

If the target LAN speed is the same as the source — that is, a frame being switched from one 16M bit/sec port to another — then the frame can be forwarded before it is completely received because as soon as the switch sees the destination address, it can acquire the token on the destination ring and begin sending the frame.

Continued on page 4

Continued from page 44

A cut-through switch can make a major difference over a store-and-forward switch in a one-to-one, station-to-file server situation. However, when implementing a burst protocol such as NetWare's packet burst or a windowing protocol such as TCP, users may not notice the minimal difference. Our tests using packet burst show that the effect of latency is indeed reduced since a file server can return a stream of packets in response to a single request from a workstation.

Finally, for small packets, which are common in many terminal-to-host applications, latency is negligible. For example, a 30-byte token packet on a 16M bit/sec token ring only takes 15 microsec to be completely received at a switch.

HALF VS. FULL DUPLEX

Many of the token-ring switch vendors are or will be supporting a mixture of half- and full-duplex token rings at the switch on a port-by-port basis. In a switched LAN, if there is only a single station per port, then there is no need for the token passing protocol, eliminating token acquisition time altogether. Removing an adapter's repeat path allows the token-ring adapter to receive a frame on one path and transmit on the other simultaneously. This full-duplex operation potentially doubles the throughput at a workstation or file server.

A full-duplex token ring attachment is really not a token ring at all but rather a point-to-point link. Some existing token-ring media access control frames are still utilized, however, such as those used to indicate soft or hard errors. And, of course, the same token-ring frame format is maintained for compatibility and switching to and from standard token-ring half-duplex ports.

Since full-duplex operation only supports a single connection, full duplex is most beneficial when you can afford to attach only a single device to a switch port. This may be the case with a server gateway connection to a router.

Eventually, the cost per port may be such that a switch completely replaces a wiring hub so every device can have a full-duplex connection. Since not all existing token-ring adapters will be upgradable to full duplex, some stations may remain half duplex until newer adapters can be swapped in.

SWITCH SCALABILITY

As you not only add more devices or segments to your networks, but also refine their functionality or provide additional services to users, switch scalability becomes an important issue.

If you fill up all the ports of all the modules in a switch, you need a high-speed switch-to-switch interconnection technology, such as Asynchronous Transfer Mode or Fiber Distributed Data Interface. Otherwise, devices not directly attached to the same switch as a server, for example, would lose the inherent benefits of a switch's high-speed internal backplane. A high-speed interconnect is also desirable when switches are geographically dispersed in wiring closets.

A stackable switch architecture can also promote switch scalability. Here, a proprietary external bus connection is typically used to tie together switches as though they were one, with little or no performance penalty between switches. With this approach, of course, the switches must be in proximity to one another.

Finally, a switch may have modules that support a wide variety of topologies and media types. Adding ports can then be as simple as adding modules, up to the capacity of the chassis.

BRIDGE-LIKE FEATURES

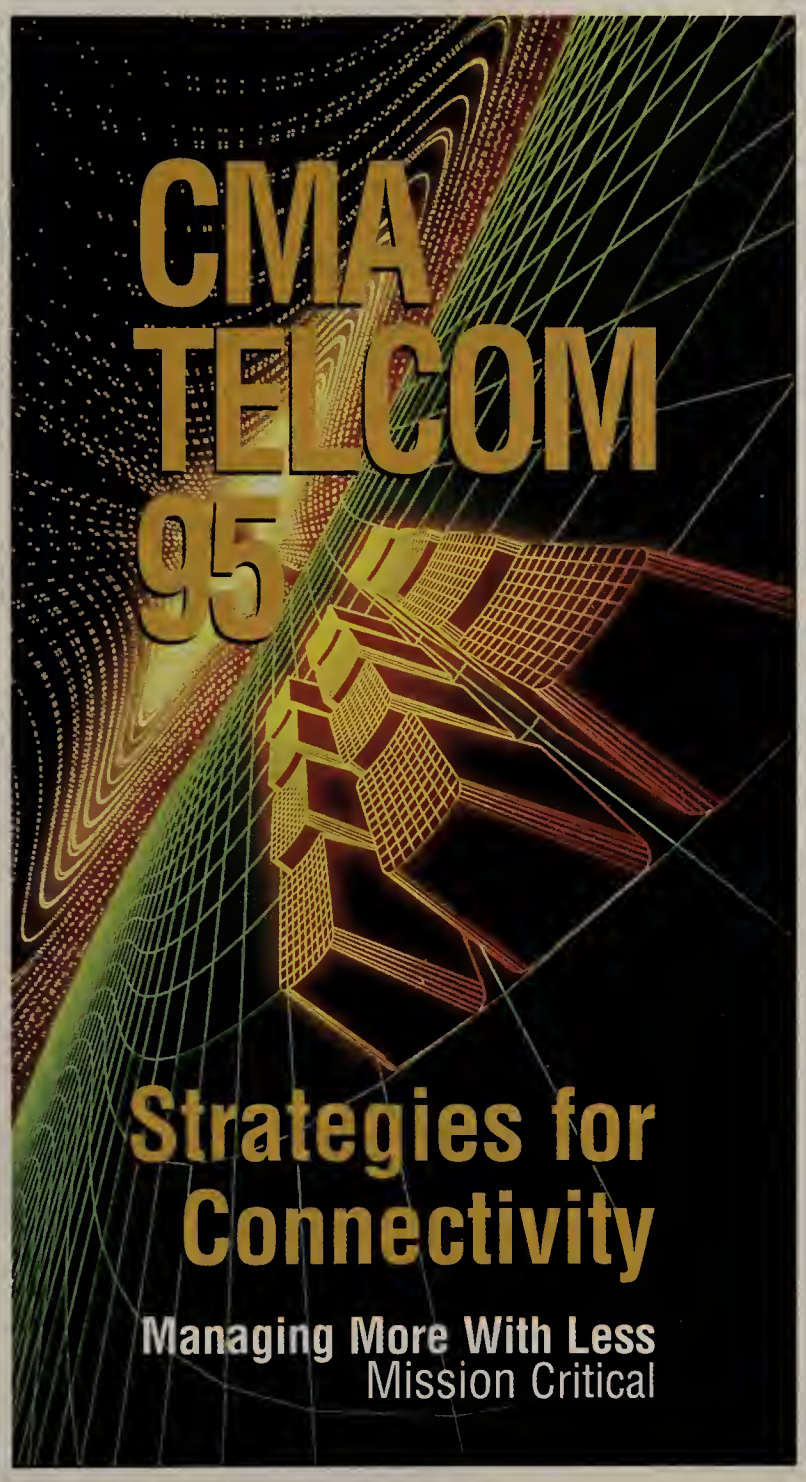
Since a switch most closely resembles a multiport bridge, you expect similar operational characteristics and capabilities.

For starters, supporting source route bridging is important for token rings because one of the target markets for a token-ring switch is to replace source route bridges.

If an organization's infrastructure is not designed around source routing, then support for transparent bridging with Spanning Tree Protocol (the IEEE 802.1d bridging standard used in thousands of Ethernets) may be desirable.

Most of today's bridges have filtering and management capabilities, which have also carried over into switches.

Station and broadcast filtering are basic requirements, as are support for inband (over the network) management via Simple Network Management Protocol and out-of-band management via a direct connect or dial-up serial port. ■



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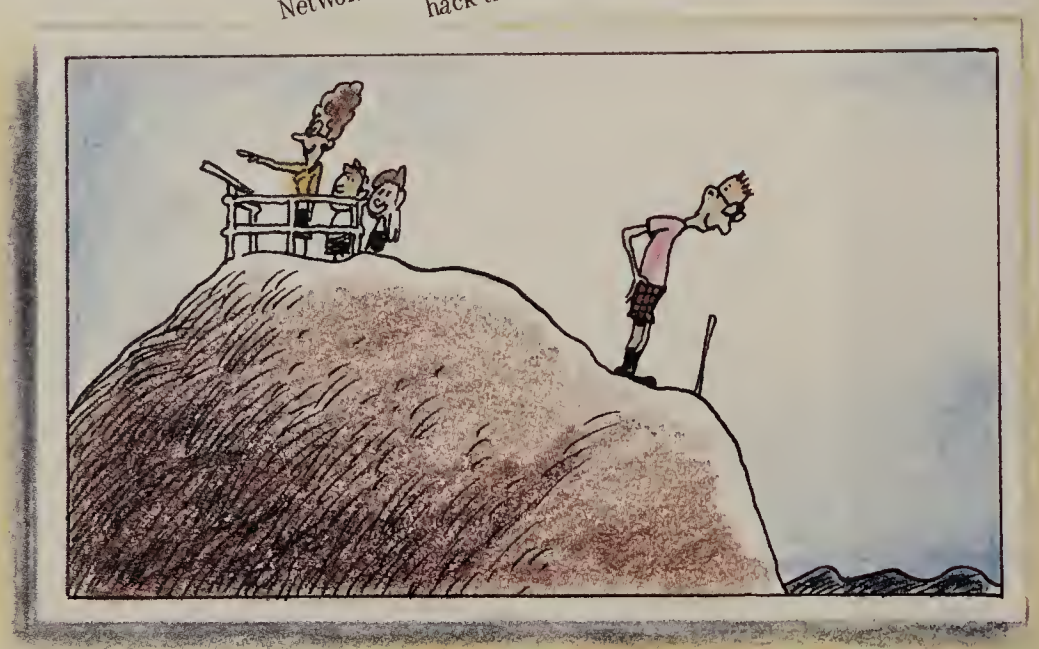
How I Spent My Summer Vacation

By Ed Muxmeister Network Manager

by Joe Troise and Phil Frank

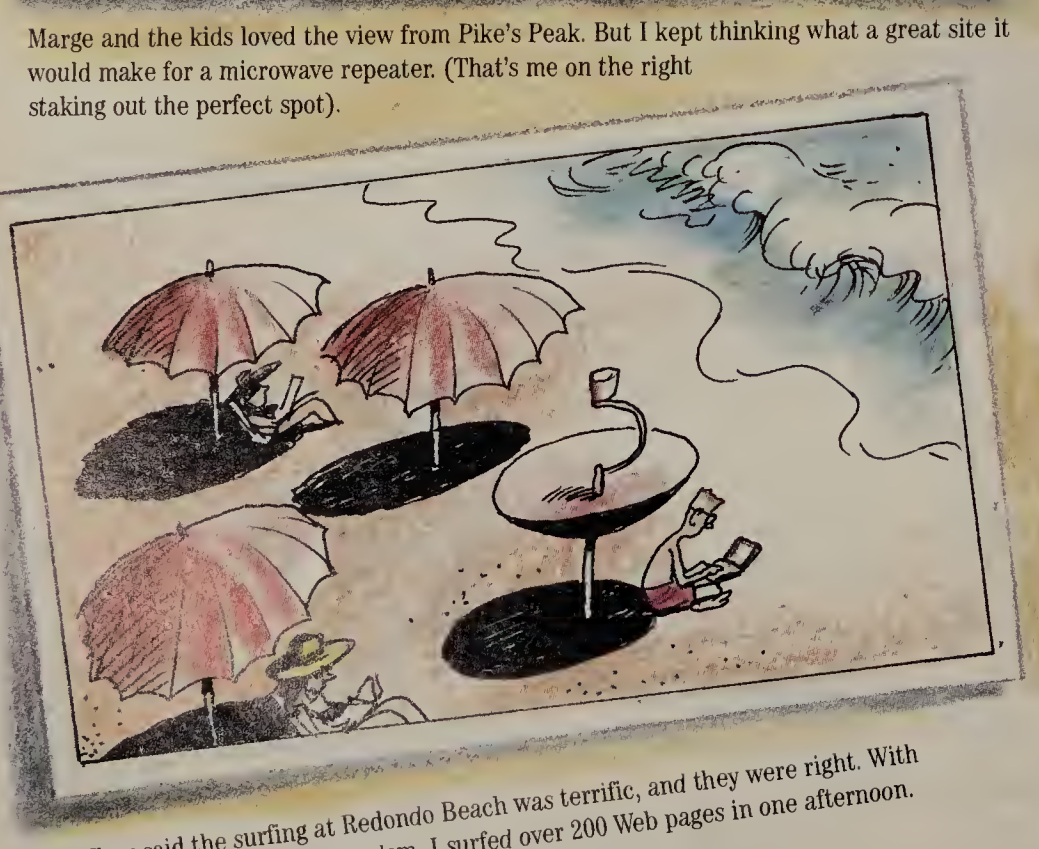
I just had to show the family Atlanta, even though they'd be too early for NetWorld+Interop. We took the CNN tour and the kids begged me to hack their network, so I had to oblige.

Ol' "Grand Prix" Muxmeister almost made the run to Colorado in a single day. Marge just couldn't believe my PDA had a radar detector port; if only those darn kids hadn't plugged in my electric razor instead...

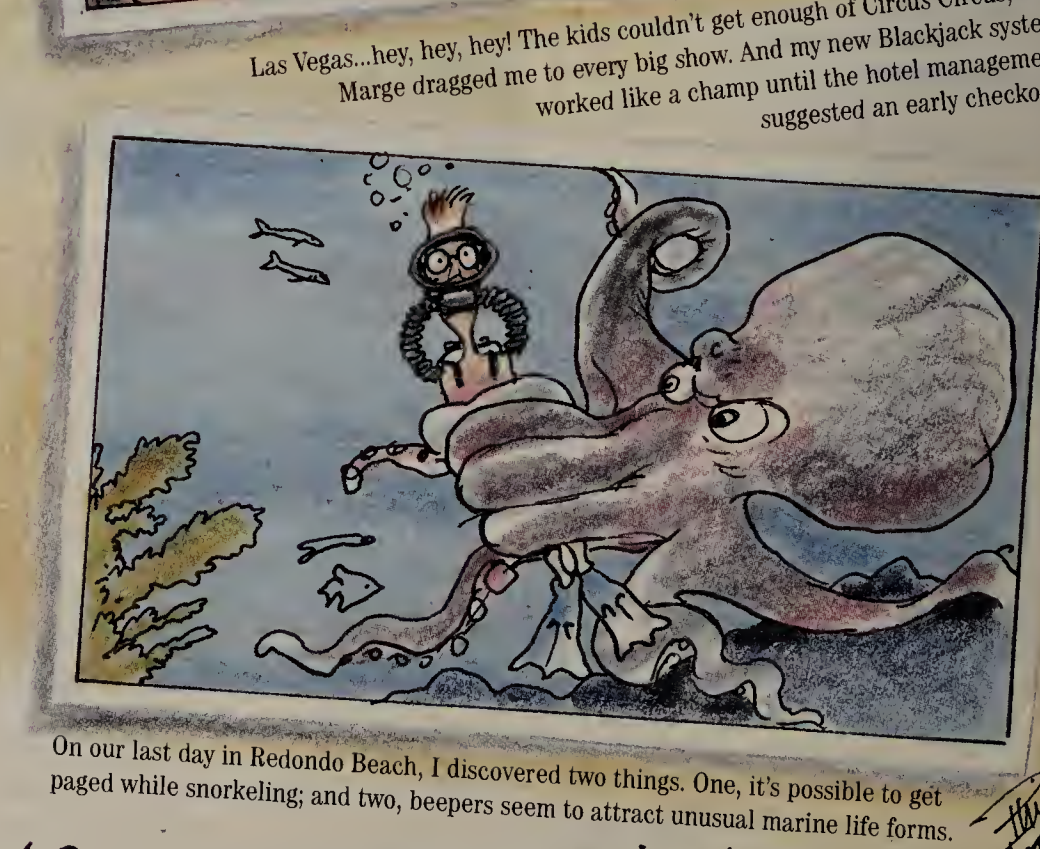


Marge and the kids loved the view from Pike's Peak. But I kept thinking what a great site it would make for a microwave repeater. (That's me on the right staking out the perfect spot).

Las Vegas...hey, hey, hey! The kids couldn't get enough of Circus Circus, and Marge dragged me to every big show. And my new Blackjack system worked like a champ until the hotel management suggested an early checkout.



They said the surfing at Redondo Beach was terrific, and they were right. With my laptop and wireless modem, I surfed over 200 Web pages in one afternoon. No wipeouts!



On our last day in Redondo Beach, I discovered two things. One, it's possible to get paged while snorkeling; and two, beepers seem to attract unusual marine life forms.

Phil Frank

P.S. I'll be out of the hospital in 3 weeks. See you at the office. Ed

Briefs

■ **Data-Tech Institute** *and* **Technology Interchange Group, Inc.** *have released The Help Desk Analyst's Workshop, a* **self-teaching video package** *for help desk staff, support technicians and network administrators. The package contains a 2-hour video and a comprehensive course workbook.*

The video covers the help desk analyst's role and environment, training opportunities, various support skills and techniques, and methods for avoiding job fatigue. It also covers help desk successes, pitfalls, trends and developments expected in the immediate future.

The workbook supplements the video with details about improving people skills, enhancing problem-solving skills, writing technical documents and building the help center library.

The Help Desk Analyst's Workshop costs $295.

Technology Interchange Group: (201) 478-3606.

Plan ahead for the arrival of 888 code

New toll-free number could mean lost business for the unprepared; consumers need a reason to switch.

By Daniel Briere and Keri Gascoyne

The introduction of new 888 toll-free numbers promises to bring with it a heavy dose of consumer fear and uncertainty, issues net managers will have to deal with to prevent corporate marketing initiatives from falling flat.

But with proper planning, internal communication and perhaps some reallocation of existing numbers, you can lessen the impact of the new codes.

"This is a lot different than an area code change," says L. Thomas Walton, president of Walton and Walton Associates, a telecommunications industry consulting firm in Richmond, Va. "Here, [consumers] will be able to choose among prefix options, and most will pick 800 in the beginning, unless they have a reason not to."

Indeed, early studies by our firm, TeleChoice, Inc., confirm that a heavy bias toward 800 exists, even after consumers are educated about 888. And there are indications that, in some cases, users are willing to pay more for products when an 800 number is involved (see story, this page).

"A lot of telephone dialing is habit-formed, and some of these habits are hard to break," Walton said.

He is warning his customers to start preparing new marketing and sales approaches that will have to make use of 888 because it will likely be the only prefix available starting next year.

"The little things — like software being automatically configured around 800 numbers — will impact cutovers," according to Walton. "It's on par with all the changes taking place in computer programs because they all assumed that year fields started with 19."

Vanity question

Another consideration is 888 vanity opportunities. A lot of numbers that have been tied up in the past will become available under the 888, and ensuing 877, 866, and other toll-free codes.

Companies also should assess the "brandness" of their 800 numbers. The impact of 888 is far more critical the more you consider your 800 number a brand.

"As the world's largest florist, we've invested heavily in our company and its name," said Chris McCann, vice president of operations at 1-800-FLOWERS, Inc.

"I'm hoping the FCC will protect the consumer from non-branded companies that may take advantage of consumers' trust," McCann added.

The Federal Communications Commission has yet to decide whether those with 800 vanity numbers will have first shot at the same number with the new 888 codes. Hearings continue concerning that and other issues.

A little education

To combat the expected confusion on the part of consumers, AT&T recently announced that it will begin its own education campaign. Other carriers are expected to follow.

"We want the transition to 888 to be as seamless as possible," said Ken Sichau, vice president of Global Services Market Management at AT&T.

The carrier's education crusade will include a comprehensive news media campaign explaining the similarities and differences between 800 and 888, and a nationwide contest that gives AT&T customers a chance to guess how many 888 calls were made during the first month the new prefix was in use.

The TeleChoice studies found that education alone will likely result in substantial swings in 888 use, and more attractive product offers should further promote usage.

The key seems to be to buy some time while the public gets used to 888, which amounts to getting more mileage out of your existing 800 numbers.

One way to do that is to consider your 800 numbers as inventory.

If you have internal data or employee access numbers that use 800 lines, consider migrating these to 888 and recycling the 800 numbers for more external uses.

Advanced 800 features present another option. If you have four 800 numbers for different applications, you might be able to combine them with an automated or customer-entered screening option, such as a menu or an automated number identification screening.

The bottom line is that companies with very public 800 strategies are going to have to rethink everything, regardless of which way the FCC goes regarding the vanity issue.

Without an economic or product incentive, 888-based goods and services are likely to have a hard time establishing themselves in the market. However, companies adroitly managing the two approaches can craft a complementary strategy that can turn a potential problem into profits.

Briere is president and Gascoyne is senior associate with TeleChoice, Inc., a consultancy in Verona, N.J. They can be reached at dbriere@telechoice.com and kgascoyne@telechoice.com.

Consumers weigh in on 888

- According to an AT&T/Roper poll, **73%** of consumers, once told what 888 numbers were, said they would be comfortable dialing the new toll-free number.

- But a survey by TeleChoice found that more than **75%** of consumers would dial an 800 number rather than 888, all other things being equal.

- More than **33%** of respondents in the TeleChoice survey said they would use an 800 number before an 888 number even if it meant paying an extra dollar for a product.

New code faces public resistance

All other things being equal, more than 75% of consumers will dial a toll-free number beginning with 800 rather than 888, according to a survey of more than 400 consumers by TeleChoice, Inc.

The survey looked at the buying behavior surrounding the purchase of flowers using numbers such as 1-800-FLOWERS, 1-888-FLOWERS, 1-212-FLOWERS and equivalents. Half of those surveyed were told that 888 would soon become another toll-free prefix but the other half were not.

Consumers who were educated about 888 were almost twice as likely to dial an 888 number than uneducated consumers. But even those who were educated about 888 numbers indicated an overwhelming preference for 800. More than 75% said that, given a choice between flowers of similar price, brand and quality, they would order from the advertisement displaying an 800 number rather than one showing an 888 number.

When shown two advertisements for the same product — one using an 800 number and the other an 888 number — more than half of the consumers educated about 888 said they would still use the 800 number even though that product cost 4 cents more.

The news doesn't get much better as the price difference is increased. When offered the choice between paying $24.95 for flowers ordered using an 888 number or $25.95 for the same flowers using an 800 number, more than one-third of respondents said they would be willing to pay the 4% difference just to order via 800.

The only exception to the rule were respondents who were less than 18 years old and those over 55, both of whom demonstrated a higher acceptance of the new 888 exchange.

By Keri Gascoyne

Toll-free issue keeps FCC busy

The Federal Communications Commission (FCC) continues to meet with carriers to hash out deployment issues regarding the new toll-free numbers. A notice of proposed rule making about the issue, including a proposal for handling the branding question, is due out in the fall. Any interested party will be invited to respond.

Additionally, users are invited to quiz carrier and government officials about details of implementing the new 888 toll-free area code at an open forum Sept. 21 from 10 a.m. to noon at FCC headquarters, 1919 M St. NW, Washington, D.C. Carriers also will outline deployment and caller education plans.

For more information, contact the Domestic Facilities Division of the Common Carrier Bureau at (202) 418-2320.

Or check out the FCC's World-Wide Web home page at http://www.fcc.gov. For 888-related information click on Common Carrier under the Bureau section.

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Chicago based major reseller of LAN/WAN Products/Services is aggressively expanding its sales and sales support activities nationwide. Immediate openings are available in several major cities within the US. Candidates must be able to utilize consultative sales skills to provide clients with a thorough understanding of LAN/WAN solutions. A minimum of 3 years successful selling or sales support experience in their geographic market is a requirement. Specific experience with AT&T, Micom, Newbridge, Cisco, or 3COM a major plus. Excellent Compensation and Benefits for qualified candidates. For considersation, please send resume and earnings history to 222 S. Riverside Plaza, Suite 820, Chicago, IL 60606 or fax to 312-254-1443.

The September 25th issue has **10,000 Bonus Distribution** at the **Interop Show in Atlanta** and our **Annual Salary Survey**

What better place for your recruitment message?

Ad space close is Wednesday, September 13th.

Call Pam at 1-800-622-1108 for more information

For information on advertising in Networking Careers call: *Pam Valentinas*
1-800-622-1108

Position available for Product Line Manager (Mobile Communications). Duties include assisting in directing the research and development of mobile communications systems for integration of information to Innovative Transportation System on AS/400 RPG. Engage in system engineering design discussions with mobile communication vendors for software integration and ensure timely completion of projects in accordance with Innovative Transportation System quality standards. Manage technical activities of programmer analysts and programmers engaged in mobile communications strategic product development. Must have one year of experience in the job offered. Must have a masters degree in Computer Science, Computer, Mechanical or Electrical Engineering or U.S. equivalent. Applicant must have legal authority to work in the United States. Work schedule of 40 hours per week, Monday through Friday, from 8:00 a.m. to 5:00 p.m. Salary of $52,000 per annum. Equal Opportunity Employer. Contact Oklahoma State Employment Service, 6433 N. MacArthur, Oklahoma City, Oklahoma 73132, Job Order #181123 (ID#5506).

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DON'T FORGET

...to access the Networking Careers On-Line Bulletin Board for a listing of the past four weeks of Careers ads.

Dial-up (508) 620-1160 and go to the Networking Careers On-Line Bulletin Board.

FREE PRODUCT INFORMATION

Reader Service

Use this coupon or prepaid post card in the September 11th and September 25th issues. Circle Reader Service numbers of ads that interest you and complete the information below.

Expires 12/31/95

Name: _____
Title: _____
Company: _____
Phone: ( ) _____
Street: _____
City: _____
State: _____ Zip: _____

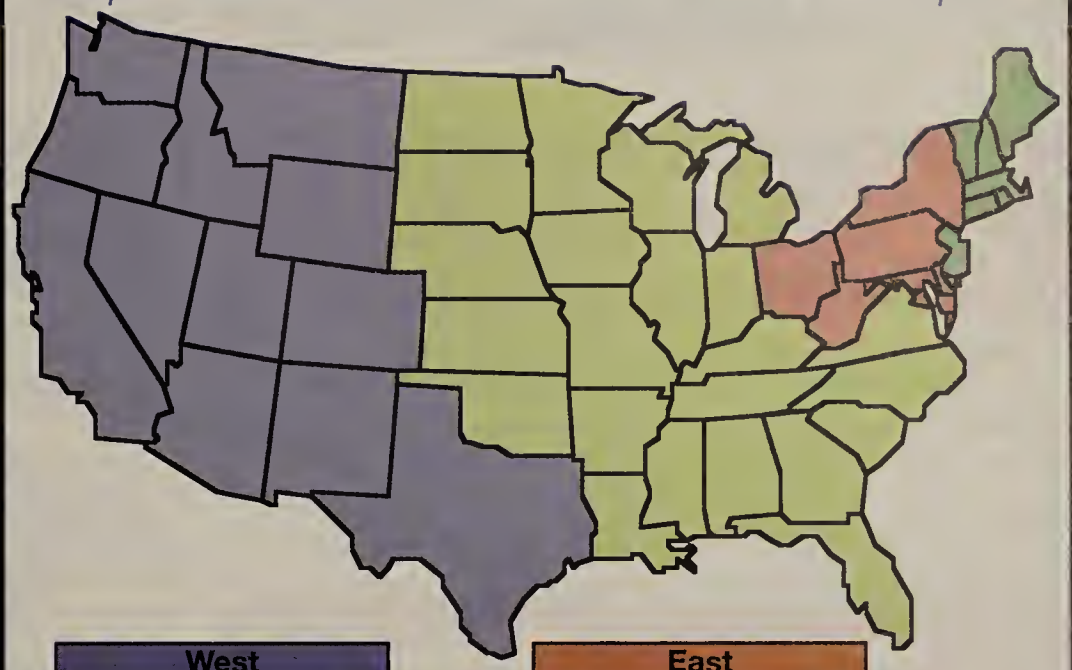
217	218	219	220	221	222
223	224	225	226	227	228
229	230	231	232	233	234
235	236	237	238	239	240
241	242	243	244	245	246
247	248	249	250	251	252
253	254	255	256	257	258
259	260	261	262	263	264
265	266	267	268	269	270
271	272	273	274	275	276
277	278	279	280	281	282

Mail to: NW P.O. Box 5090, Pittsfield, MA 01203 or,
Fax to: NW at (413) 637-4343

9/4/95

DIRECT RESPONSE ADVERTISING
Sales Territory Map

Response Card Decks • ActionCenter • Formatted Marketplace



West
Clare O'Brien

East
Rina Campisano*

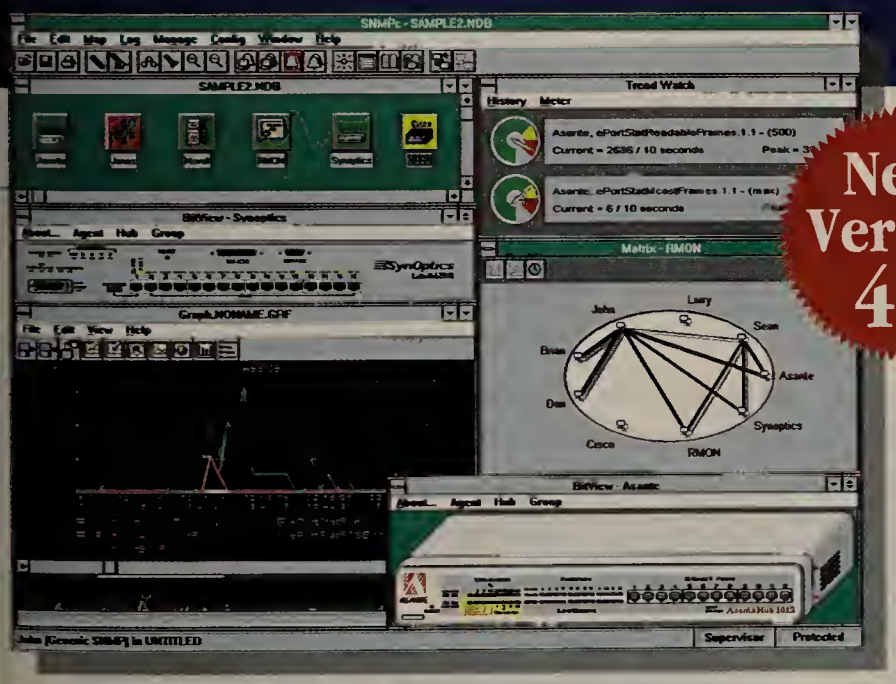
Central
Richard Black

Northeast
Joan Bayon Pinsky

508-875-6400 or 800-622-1108

* All inch Marketplace ads are handled by Rina.

SNMPc
Network Manager for Windows



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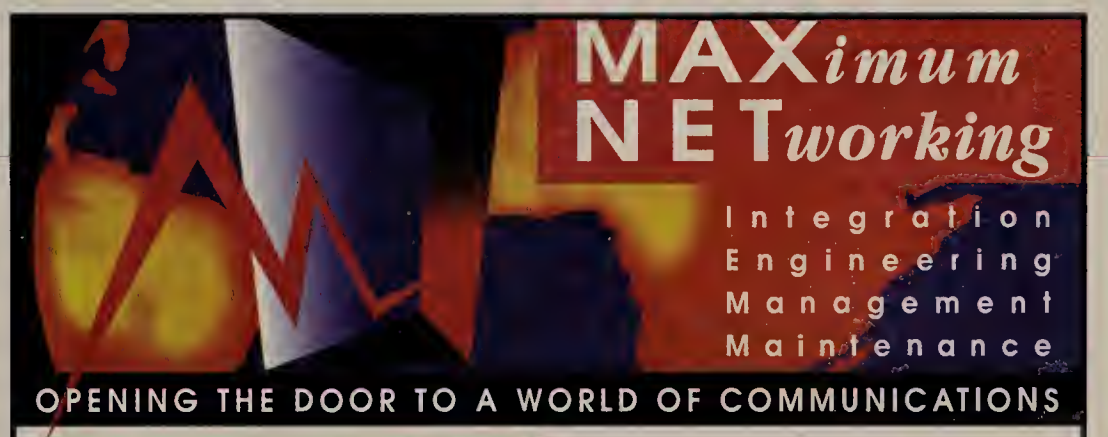
Castle Rock Computing

408-366-6540
Fax: 408-252-2379

Reader Service No. 252



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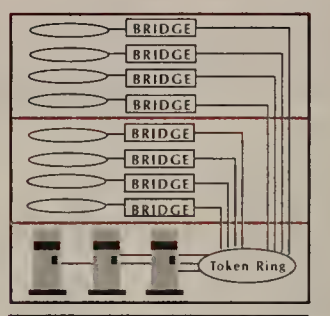
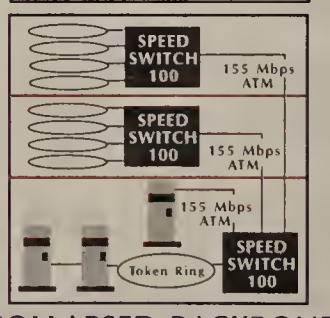


After



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Issue Closes: Sept. 13

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No. USER	Ver. 3.12	Ver. 4.1
5 user	$ 435.00	$ 435.00
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* Netware Connect v.3.0 / 8-Port	$1,245.00
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Circle Reader Service No. 272

Coming This Fall

Product Reviews

Issue Date		Close
September 4	Comparative Review on token ring switches.	Aug. 23
September 11	NOS Review Series on NetWare 4.1.	Aug. 30
September 18	NOS Review Series on Banyan VINES 6.0	Sept. 6
September 25	NOS Review Series on Windows NT Server 3.51.	Sept. 13
October 2	NOS Review Series on LAN Server 4.0.	Sept. 20
October 9	Comparative Review on license metering products.	Sept. 27
October 16	Comparative Review on anti-virus software.	Oct. 4
October 23	Comparative Review on help desk software.	Oct. 11
October 30	Single Product Review on Brainstorm Technology's OfficeLink for Lotus Notes or Fax server software.	Oct. 18
November 6	Comparative Review on fax server hardware.	Oct. 25
November 13	Comparative Review on remote node software.	Nov. 1

Please note that comparative and single product review dates and topics ore subject ta change without notice.

Bonus Distribution at

- Networks Expo, Dallas
- Networld+Interop, Paris
- Unix Expo, New York
- TCA, San Diego
- Networld+Interop, Atlanta
- Telecom '95, Geneva
- Internet World, Boston
- Comdex Fall, Las Vegas
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To reserve your ad space call Rina Campisano at 1-800-622-1108 ext. 465

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Computerworld	24%	**76%**
LAN Times	23%	**77%**
Network Computing	21%	**79%**
Data Comm	17%	**83%**
LAN Magazine	15%	**85%**
CIO	12%	**88%**
Macworld	7%	**93%**
Open Computing	6%	**94%**
Digital News & Review	5%	**95%**

Source: *Network World* 1995 Duplication Study.

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Company _____

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City, State, ZIP _____

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Circle Reader Service No. 217

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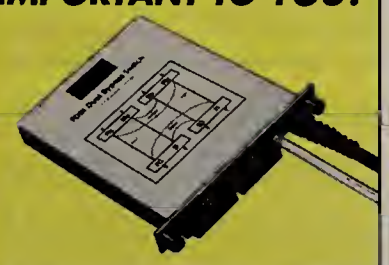

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Bay Networks	All	Call
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Circle Reader Service No. 240

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16670 12 port	$575
16671 24 port	$925
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2813-04	$850
3030-0	$400
3512	$500
3002	$450
3514ST	$1750
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NETWARE

# of users	3.12	4.1
5	$485	$495
10	$1075	$1075
25	$1475	$1475
50	$1875	$1875
100	$2675	$2675
250	$4675	$4675

INTEL 8100 COMBO $70

NOVELL 8 PORT 10BT HUB $100

3Com New 24 PORT 10BT HUB $700

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TOKEN 16/4MB	250	250	250	250	250

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Circle Reader Service No. 271

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Expires 12/31/95

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Company: _____
Phone: ( ) _____
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109	110	111	112	113
114	115	116	117	118
119	120	121	122	123
124	125	126	127	128
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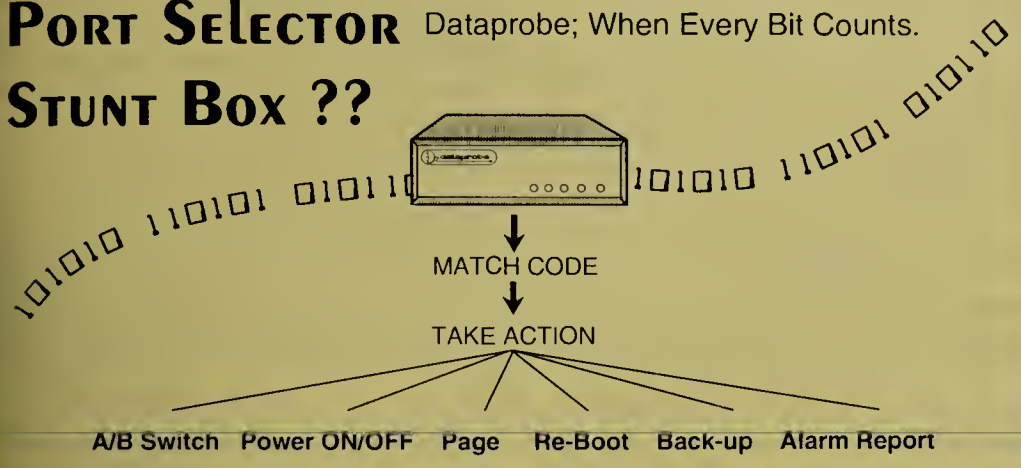

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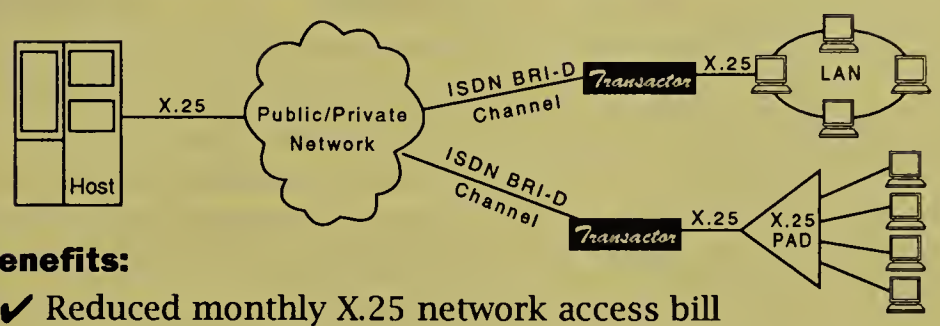

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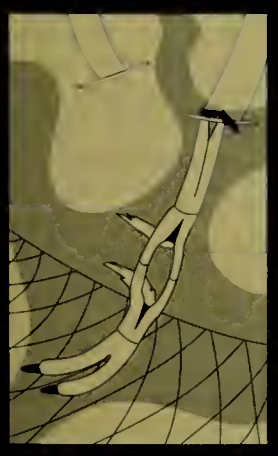

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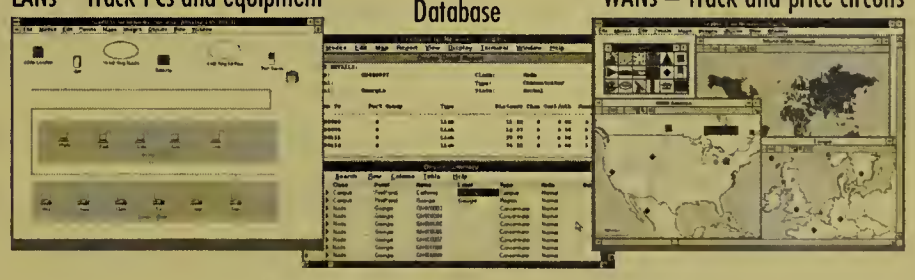

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Cellular

Continued from page 6

But there are a few outstanding issues. One is that increasing user connect time to the pricey cellular net by giving the user all these functions could make monthly phone bills skyrocket.

"You, as the user of the device, pay for receiving calls and faxes. Why pay analog cellular rates for this when you have a similar capability with the [less expensive] paging network?" asked Iain Gillott, manager of wireless communications in the Austin, Texas, office of consultancy Link Resources Corp.

The paging method puts the fax-forwarding function into the network instead of the user's device, he explained. Users paying a flat, low monthly paging fee can receive a fax notification, dial in to the paging provider's network and forward the fax to any fax machine — paying no connect-time charges.

Another issue is the price of the phone. Air Communications is selling it to carriers for $695; they, in turn, will bundle it with airtime and resell it at their own price — $400 to $500 in Ameritech's case. Gillott said most users probably won't be willing to replace their existing, brand name phones with something this pricey.

According to Ameritech, it intends to offer trade-in incentives to get users to replace their cell phones with AirCommunicators. The bigger the user's monthly volume, the bigger the trade-in value of the phone, Hendrick said. ■

IBM

Continued from page 1

bone switching and Network BroadBand Services (NBBS). NBBS is the crown jewel of IBM's ATM plan because it is the controlling entity, setting everything from virtual LAN connectivity and bandwidth requirements to congestion control.

"What IBM is proposing with SVN is the architecture other vendors will be measured against from here on out," said Tom Nolle, president of CIMI Corp., a consultancy in Voorhees, N.J.

Periphery switching devices include existing products, from the Nways 3746 Switch Controller — IBM's front-end processor adjunct that will support Systems Network Architecture migration to ATM — and 3172 Interconnect Controller to 827X LAN switches and ATM adapters for workstations.

(As an aside, IBM executives confirmed that they will miss the Sept. 30 ship date of the 8272 Token-Ring switch, citing a dearth of Application Specific Integrated Circuit chips.)

IBM's forthcoming Nways 2220 Model 200, a hybrid router/switch, also falls into the periphery switch category. Periphery switching products will be outfitted with routing software and ATM LAN emulation support, where necessary.

"Routing functions will remain in our new architecture, but the days of the stand-alone routers are past. They are dinosaurs"

Daniel Abensour

"The strategy here is to preserve existing device and application investment as users move into the switched environment," said Daniel Abensour, program director of IBM's ATM market development group.

Periphery devices in branch offices or on departmental nets will be tied to backbone ATM nets through either frame relay or 155M bit/sec ATM uplinks.

Backbone switches, which IBM describes as native ATM devices, include the Nways 2220 switch family and the ATM-based 8260 Nways hub. These will be tied together via ATM trunks.

NBBS is the glue that holds SVN together. A feature of NBBS, Multiprotocol Switched Services (MSS), will control the routing and bridging functions of periphery devices, as well as traffic control and congestion management of the backbone switching components.

Every device in the SVN environment will run some portion of NBBS/MSS code. Some devices, such as the Nways 2220 switches, already run NBBS software, but it still needs to be added to products such as the 3746, 3172 and 8260.

NBBS is IBM's ace, analysts said. Getting it deployed across the Nways line and out to the desktop should be IBM's chief priority because it will enable complete end-to-end control of the ATM environment, Nolle said.

Despite its potential, analysts said IBM still has its work cut out for it.

"Internetworking users coming into the ATM world won't immediately look at IBM because IBM has been notoriously weak there," said Todd Dagras, principal of Montgomery Securities in San Francisco.

Anura Guruge, an independent analyst in New Ipswich, N.H., said, "How SVN handles the multivendor, multiprotocol world is not readily apparent, and today most networks are both, so IBM is counting on a leap of faith from users if they are to buy the SVN approach.

"IBM's inability to deliver key components of SVN on time, namely the 8272, will make users nervous about investing in a complete IBM end-to-end solution." ■

Network Notes

Continued from page 1

vice, called Hoover, to customers it could not reach before, said Ellen Slaby, the company's director of marketing communications.

SandPoint would like to offer another service — called Business Topic Research — over Network Notes, but the firm has not done this yet because it cannot run its application software on AT&T's servers, Slaby said. The research service allows users to submit an ad hoc query to Hoover, which finds the related articles.

First impressions of Network Notes

The good

- Allows development of broader Notes services.
- Notes administration is handled by third party.
- Can be less expensive than going it alone.

The bad

- Users cannot run their software on AT&T servers.
- Fax gateway will not be available until after October beta test.
- Some security concerns exist.

Emphasis on security

AT&T has not allowed customers to run their own software at its server farm because doing so may threaten the system's security, according to Janet Stone, an AT&T spokeswoman. She said AT&T would consider each request, however, and make a decision after testing the software.

The service's security is a primary concern for ELF Technologies, Inc. in Mercer Island, Wash., which built a Notes network in 1991 to let corporate legal departments and their outside law firms share documents related to legal affairs, according to Cynthia Lavoie, ELF's marketing director.

Now ELF is considering replacing its own Notes data center with the AT&T service but needs to be convinced that Network Notes will be secure.

Currently, ELF uses an array of Notes security features, such as protecting individual Notes directories from unauthorized access.

"These features require a lot of strategic and technical planning on the part of our data center staff, and we want to ensure these features are carried out if we use a different service," Lavoie said.

ELF is working with AT&T to see whether the carrier will be able to deliver the same security as ELF currently offers its customers.

"I think AT&T is exploring and learning about how to take advantage of all those features," Lavoie said. "We've found them very open to learning and suggestions."

Another early customer is Dallas-based TitleLink, an online service provider that has created a Notes-based network that lets banks, mortgage companies, real estate firms and others track their transactions with property title companies. The company embraced Network Notes last June to avoid a big, costly expansion of its Notes infrastructure.

"It was a good way to outsource that part of our business," said Jody Lane, TitleLink's president. "They give everybody a competitive dial-in rate for this service. Basically, they can do it cheaper for you than you can for yourself."

He added that it is difficult to put a firm dollar figure on the savings but estimates that TitleLink has cut its cost of maintaining a Notes network by about 25%.

Performance has been satisfactory so far, according to Lane. But for customers moving large numbers of documents, AT&T eventually will have to support faster access to Network Notes by supporting ISDN and leased lines, he added.

To meet other customers' demands, AT&T is also looking to enhance Network Notes by offering a fax gateway. The beta release, once scheduled for August, has been bumped back to October. ■

cc:Mail-Web

Continued from page 1

Until cc:Web Mail ships later this year, however, traveling cc:Mail users are still stuck carting around a laptop outfitted with a mobile electronic mail client, and hunting down a phone jack to make a connection.

The price of forgoing the laptop is reduced functions, but the basics, including the ability to send and receive E-mail, make cc:Web Mail a good option, according to a user who saw the product demonstrated last month. Lotus would not comment on the new product, which is expected to enter beta testing shortly.

In an early version of the product demonstrated for *Network World*, users log on to the Web and key in a password. A Web page then appears with basic cc:Mail options, including an in-box, drafts, message log, trash can, folders and bulletin boards.

All messages will appear when a user clicks on the in-box. There will, however, be no notification as to which messages users have already read when they call up the system. The initial release will also not let users send file attachments, although they will be able to receive them.

Additionally, the first release will not include some standard cc:Mail features, such as access to personal directories or type-down addressing, which allows users to call up all users' with the same first name by typing that name. It also will not offer access to archives, smart icons or the ability to work off-line.

Initially, cc:Web Mail will run only on Microsoft Corp.'s Windows NT Server. This decision could signal a move away from OS/2, Lotus' traditional server platform choice, and toward NT, which is becoming increasingly strategic for Lotus.

In fact, Lotus InterNotes, which converts Notes documents into HyperText Mark-up Language, runs only on NT.

Mail users who have not seen cc:Web Mail said they are looking forward to checking it out. "Providing they have taken care of the security issues of connecting to the Internet, I think it is a great idea," said Scott Webster, a cc:Mail user with Canadian Occidental Petrol, Ltd. in Calgary, Alberta.

And if security is a problem, Webster said users could build a firewall around their Internet connection to keep it safe.

He added that the Internet is a great way to accommodate mobile users and it makes sense for Lotus to make its cc:Mail Post Offices available through Web browsers. ■

Peoplesoft weaves workflow into applications

Version 5.0 suite to include manufacturing, other new workflow-enabled modules.

By Barb Cole
Orlando

Peoplesoft, Inc. next week will announce an upgraded suite of client/server applications that include built-in workflow and a revamped user interface.

The Pleasanton, Calif., company will ship workflow-enabled versions of its Financial, Distribution, Human Resources and Manufacturing applications by year-end, sources said.

In addition, a new line of Manufacturing modules will ship with built-in workflow by the first half of 1996.

Peoplesoft confirmed that it will roll out Peoplesoft 5 next week at its annual user conference here but declined to comment on specifics.

Users familiar with the plans were enthusiastic about the workflow capabilities.

"Workflow is the biggest enhancement by far, although they have also improved the front end and taken out some of the esoteric keystrokes that were once required," said Kathy Lennon, director of corporate systems at Coastal Corp., a Houston energy holding company.

The arrival of built-in workflow is especially timely for Coastal, which uses Peoplesoft Accounts Receivable and will soon implement Accounts Payable, Purchasing and Costing Modules.

"We just completed a reengineering study, so it will be a great opportunity for us to implement the workflow within the modules," Lennon said.

Peoplesoft Messaging Workflow will let users integrate electronic forms software, voice response systems, information kiosks and other media with Peoplesoft applications.

It will be implemented using Peoplesoft Messaging Agent, an open API that will work with several messaging platforms, including the Internet.

Another layer, dubbed Application Workflow, will allow users to define rules to manage the flow of work within the applications.

Several client/server application vendors, including Oracle Corp., have recently announced plans to built workflow capabilities into their modules.

Analysts described Peoplesoft 5 as a significant release that will help users more easily manage common business processes.

"I'm impressed with their implementation of workflow," said Barbara Noti, an analyst at META Group, Inc. in Stamford, Conn. "In earlier versions, you had to go in and out of lots of menus to work your way around."

In addition to the workflow capabilities, Version 5 will include several new modules (see graphic).

The modules work with a handful of relational databases, including those from IBM, Informix Software, Inc., Oracle and Sybase, Inc. Pricing information was not available.

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Peoplesoft product preview

Product line	New modules	Availability
Financial	Project costing, billing and budgets	Year-end
Distribution	Order management and distributed requirements planning	Year-end
Manufacturing	Engineering, bills of material, master scheduling, MRP, capacity planning, production control and cost management	First half of 1996

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Novell

Continued from page 1

NetWare and UnixWare that could take several years to roll out.

SuperNOS was to be a combined file server and applications server that would compete head-to-head with Windows NT. Novell will not complete the first stage of SuperNOS until late next year, which is too late to compete effectively with Windows NT as an all-in-one product, observers said.

The new effort involves extending core NetWare services, such as security and NetWare Directory Services (NDS), so they can be used to link other operating systems to NetWare, as well as rolling out a long-awaited symmetrical multiprocessing version of NetWare.

In addition, Novell plans to pitch its Tuxedo transaction processing monitor as middleware for linking NetWare file servers with application servers running other operating systems (*NW*, Aug. 28, page 1).

Novell will continue to add features to NetWare over the next few years that will make it a better application server — one that shares code with UnixWare and has tighter security.

However, the company will concentrate on developing and integrating its networking products so they can act as the fabric of a heterogeneous network into which users can plug their favorite operating system for specific applications.

Novell officials declined to comment.

The model seems to make sense if all the pieces can be tweaked to work seamlessly, said Rob Enderle, an analyst at Dataquest, Inc. in San Jose, Calif., who had not been briefed on the plan.

It would position NetWare as the integration point of heterogeneous networks, thus providing in client/server networks the kind of security, administration and control that is common in host-based networks, he said.

The model would also give Novell a good answer to users who have criticized the vendor for not supporting the products they want to use. "Novell needs to recognize that NT Server is a valid player, and they haven't done that yet," said Neil MacDonald, an analyst at Gartner Group, Inc. in Stamford, Conn.

The model seems to make sense if all the pieces can be tweaked to work seamlessly, said Rob Enderle, an analyst at Dataquest.

The first version of the plan calls for Novell to position a set of its products, including NetWare, UnixWare, Tuxedo and others as the basis of an enterprise network that users can navigate using NDS.

NetWare users, for instance, would be able to find in their directory an object that represents an application running on a Windows NT server in another office and access it through Tuxedo.

NDS would become a metadirectory in the network, synchronizing the name spaces in Windows NT and other NOSes using Microsoft's recently announced Open Directory Services Interface, sources said.

The architecture includes putting NDS onto other network operating systems as a standalone directory linking them to NetWare, or as part of Tuxedo.

Novell is replacing the name space in Tuxedo with NDS, a move that will, by default, bring NDS to all the platforms Tuxedo supports.

It also includes the integration of Tuxedo with the NetWare Embedded Systems Technology, a cut-down version of NetWare being built into minicomputers, servers, mainframes and intelligent devices.

Novell will accompany the new plan announcement with details of a comprehensive program to rebrand many of its products and revamp its marketing to present a new face to the public, Novell officials said (*NW*, Aug. 14, page 1).

Novell will continue to approximately follow the development path it has already outlined for SuperNOS but will focus on networking rather than application serving in its technology development and marketing, sources said.

While many of the details of that plan could change, it does include a common set of APIs that would let developers build software that would run natively on either NetWare, UnixWare or future variants of SuperNOS, according to sources. Under one version of the plan, Novell would call those applications Loadable Modules. The firm will also announce availability of NetWare SMP as a short-term answer to the need for better application serving in NetWare. ■

ATM

Continued from page 8

$12,000. The dual-Ethernet module will cost $6,250.

On the ATM trail

In other wide-area ATM news, Ascom Timeplex, Inc. recently announced an ATM interface for its backbone Synchrony ST-1000 switch, expanding the switch's role of carrying time-division multiplexer and frame traffic over leased lines.

The enhanced version includes an ATM card, which is called Synchrony ST-1000 Data InterNodal Link (INL), that fits in one slot on the ST-1000 chassis.

The switch can interface on the wide-area side with other ST-1000s or a public ATM network. DataINL is available now with a JT-2 (6.312M bit/sec) interface to the wide area for $18,750.

The company plans OC-3 and OC-1 interfaces for later this year, and DS3, SDH-1 and E3 interfaces sometime next year.

Data INL is the first step in Ascom Timeplex's Millennium program, which is designed to migrate users toward ATM while delivering circuit, packet and cell traffic anywhere within the network. ■

Back to Reality

Net busy work keeps administrators needlessly hot and bothered

The Bible tells us that faith is the substance of things hoped for, the evidence of things not seen. LAN administrators, who are regularly assailed by vendors telling tales taller than Jonah's whale, side more with Mark Twain's definition: "Faith is believing what you know ain't so."

Optimists are rare in Userland, unless they don't have much experience. To paraphrase John F. Kennedy, every bright spot LAN administrators find in grand vendor strategies is like the policeman bending over the body in the alley and saying cheerfully, "Two wounds are fatal. The other one is not so bad."

David J. Buerger

The secret strategy behind vendor promises is to lure LAN managers with the prospect of becoming white-collar workers.

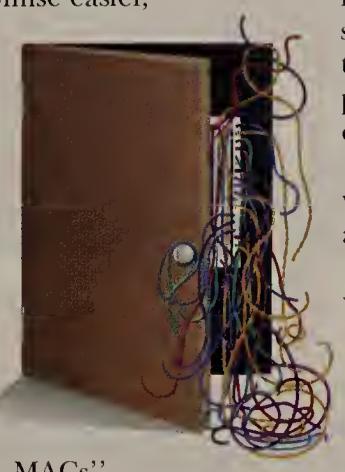
Vendors' pitch: Forget suffocating in hot wiring closets, crawling behind desks and running all over kingdom come to solve problems. You, the unsung hero of networking, will be able to forsake grunt work and become a strategist, all from the comfort of your own desk.

(Cut to ad photo) Calm, well-coiffed network manager in Brooks Brothers suit sits at spotless desk, clicks on a tell-all icon, puts hands behind head, leans back and sips the fresh java. Ahhhh.

Ka-ching go vendor cash registers.

MAC madness

The newest trend in strategic proclamations by internetworking vendors is virtual LANs. They promise easier, cheaper and better management.



Chopping management costs is an important goal. Businesses spend at least $1,300 a year per end user just for information technology support, according to Howard Anderson, managing director at The Yankee Group. Anderson said that cost is rising 14% a year.

Part of the high price tag is corporate America's own fault. Managers feel useful only when they're doing something, which usually means moving people around like pawns on a chessboard. Consequently, LAN administrators are kept busy "doing MACs" — their lingo for moves, adds and changes.

The annual MAC churn rate varies from 60% to 80% of an organizations' head count. Each time an administrator gets an "urgent" MAC request, that person usually ends up in a structured cabling closet moving network wire pairs.

Or trying to. Documentation for cabling is one of those to-do items that is rarely checked off. A half-year of typical MAC changes transforms any wiring hub into a migraine on demand.

Helping to automate this process is one of the benefits promised by virtual LANs. But so far, it's mostly talk. Northern Telecom, however, has apparently licked this problem today with a new stripe of old technology — an electronic cross-connect switch.

NorTel is not well known for data networking solutions. Neither are most voice switch vendors. Then again, who cares? Voice, data — it's all just ones and zeros.

The switch is called Dynatrax. It sits between end-user devices, such as workstations, printers, terminals and servers, and their related local transmission equipment. The latter includes Ethernet or token-ring hubs, Ethernet and slow-speed ATM switches or links to hosts.

Dynatrax's main purpose in life is to automate moves, adds and changes. If a user's physical link must be moved to a different LAN segment, the administrator merely clicks on the user's icon and drags it to the new on-screen location.

That capability will also allow the use of one network analyzer on any LAN segment.

The modular switch can hold as many as 108 output ports to end stations and 108 input ports from the LAN hubs. Dynatrax works only with two-pair wire; four-pair support is planned.

NorTel says the cost per port is roughly $115, or $170 for connecting remote devices via TCP/IP. Buyers should yield a payback period between six and 28 months, depending on a company's churn rate and costs to make local or remote moves, adds and changes.

The biggest potential cost savings is servicing MAC changes for remote sites. That cost now averages $200 to $500 per change, according to NorTel.

An intriguing use of this box is bandwidth on demand. If a user knows he needs extra capacity for a specific application (such as a video feed), the LAN administrator can easily move the person's link to a faster segment — off-line or on the fly.

NorTel will ship Dynatrax in October. A white paper explaining the idea is available at http://www.nortel.com.

Dynatrax is an interim solution. You won't need it once ATM runs on every desktop. Don't buy Dynatrax if you believe virtual LAN nirvana is close at hand. But if you believe legacy LANs will plague us longer than we hope, Dynatrax sounds like a clever and cheap solution.

This is one case where faith in a negative outcome could bring happy results.

For the record

In my column last week, I made an egregious mistake. I said the federal government had relaxed export restrictions on encryption software. I gave those deep thinkers too much credit. They are *considering* this policy change. God forbid I would create the misperception that Uncle Sam is capable of reacting to market realities the way we do.

Buerger is an Atlanta-based writer and industry consultant. He can be reached at dbuerger@pipeline.com.

ABEND

abend *(n)* **1:** abnormal end to a computer process **2:** the column that spares no expense to bring you the insights of Internet users and other high-tech wits

The All-Microsoft, All-the-Time Win95 Abend column (with the help of rec.humor.funny)

Other songs they could've picked:

(Trevor Inkpen)

For those with only 8M bytes of RAM:
"(I can't get no) Satisfaction"

For those with 486s:
"Time is on my Side"

For those with existing non-plug-and-play hardware:
"19th Nervous Breakdown"

For Win95 support staff:
"Sympathy for the Devil"

After two months on the support line:
"Emotional Rescue"

For everybody who buys Win95:
"You Can't Always Get What You Want"

Shakespeare on Win95

(Jeff Makos)

"Now is the Windows of our disk content."
— Richard V.3.0

Symptoms of Winfluenza

(Phil Daley)

Blurred vision, increased blood pressure and, in severe cases, lacerations incurred during uncontrollable muscle spasms that typically result in the destruction of the victim's personal computer.

The Book of Microsoft

(Scott Dickenshied)

And Lo! The Lord of the OS did come down among His sheep and He did sayeth, "Thou shalt pay Bill Gates and he will deliverith unto you my product.

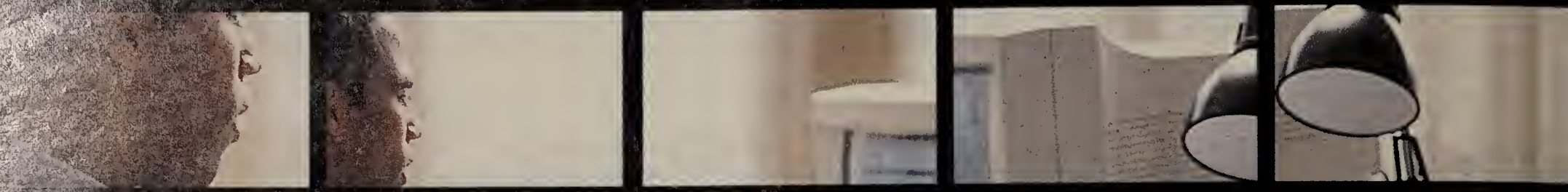
"I am Win95, your GUI. Thou shalt not have false GUIs on machines before me."

And the Lord said, "16-bit applications are evil! I am sorry I ever created them. I shall destroy them all and start over. Thou shalt all buy new computers."

And the prophet Intel came forward and said, "But Lord, what about backward compatibility? What about the tribes of 8086 and 80286 and 80386?" And Lo! The Lord became angry and said, "Compatibility is irrelevant. You will be assimilated."

Oops!

Abend recently reported on the case of Wile E. Coyote vs. Acme Co. It turns out that the piece was originally printed in *The New Yorker* about five years ago.



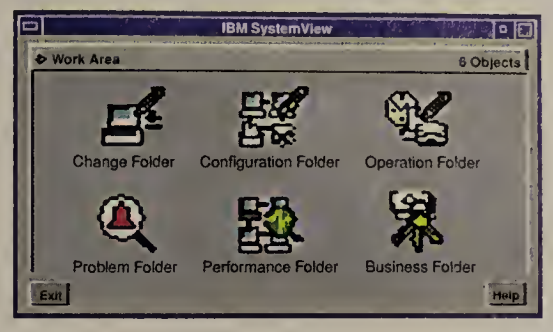
The system was demanding today.

You upgraded Windows software.

Added Novell users.

Rerouted TCP/IP traffic.

And averted a server crash across town.



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